

Conceptual IT Service Provider Model Ontology

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Abstract

The new Conceptual model of IT service provider is proposed. It could be examined as IT focused Enterprise model, part of Enterprise Architecture (EA) school [5]. According to this school, the purpose of EA is business-IT alignment. The main purpose of EA is to guide the process of IT capabilities planning and design to meet the required organizational objectives. The new IT Model clarify where the business demand is placed, how the service is designed, why the cost is spent and how it communicates with the external world. We find it necessary because the most of methodologies rely on implicit description of the reality which leads to ambiguous interpretation, misunderstandings in business process conceptions and planning. This increases exponentially the risk of project failure and loss of substantial amounts and business positions [8]. The existence of a model is an important step for understanding the business perspective. One interesting application of the first modeling is described in [9]. The paper describes the realization of Conceptual IT Service Provider Model in XML format.

Keywords: Conceptual IT Model, Conceptual IT Service Provider Model Ontology, XML

JEL classifications: M15 IT Management

Introduction

In this paper we define ontology structure of the Conceptual IT model. The Conceptual IT Service Provider Model is realized using the Ontology approaches, as a formal description of a part of reality by data type described with meta-objects and the relationships between them. It can also be described as a dictionary. We differentiate two main types of ontology: conceptual ontology and strictly formal software ontology. The conceptual type is used for analysis of business situations and identifies elements, it supports language communication for comprehension discussions, decisions and interviews in the business world. Originally the software type usage starts from artificial intelligence in knowledge based system as well as semantic net. This type is also broadly used for implementation of service oriented architectures. A briefly reviews of the most popular developed ontology used for similar purposes follows:

Web Ontology Language (OWL) [3] is a family of knowledge representation languages or ontology languages for authoring

ontologies or knowledge bases. The languages are characterized by formal semantics and RDF/XML-based serializations for the Semantic Web. Represented in RDF format it is of great usage as descriptive language which can generate, simply expressed „dictionary“ of the web. Ontology is very detailed in order communication services can be compared with a web catalog and formal description.

OWL-S [4] should enable greater access not only to content but also to services on the Web. Users and software agents should be able to discover, invoke, compose, and monitor Web resources offering particular services and having particular properties. They should be able to do so with a high degree of automation if desired. Powerful tools should be enabled by service descriptions, across the Web service lifecycle. OWL-S (formerly DAML-S) is an ontology of services that makes these functionalities possible.

Business model ontology [1] develops further his previous work of e-Business ontology and proposes ontology of business model. The details of the different elements characterize business activities. The conceptual model takes as fundamental this ontology and applies it to the IT World based on services. One interesting research and methods, based on the business model is described in [10].

E-business ontology [2] can be defined and assigned to the conceptual type described above. Builds on four basic concepts borrowed from balanced scorecards Kaplan and Norton [6]: product, customer relations management, infrastructure and finance. They correspond to four basic questions: what, who, how and how much. Following these basic classes the ontology is defined in detail. Osterwalder [1] develops further his previous work of e-Business ontology and proposes ontology of business model. The details of the different elements characterize the business activities. We found the adopted approach with holistic view most suitable for applying it in IT world based on services. Conceptual IT Service Provider Model.

The Conceptual IT Service Provider Model consists of five concepts and fifteen elements. There are 5 hierarchical levels. The Concepts are at first level. At second level are defined the main elements in shadowed rectangles. At third, fourth and fifth the elements are decomposed into sub-elements. The structure of Conceptual IT Service Provider Model is given in Fig. 1. At the schema the 5 main concepts are shown with their interactions, graphically shown with arrows. The first concept is the service itself, which includes business necessity and process as first element with the respective requirements. The designed service and its evaluation and offerings to the customer is the second main element of Service concept. The Value output is the third element as resulted business value added product with the description in Service catalogue. The second concept is the User who interacts with service and company through the elements distribution channel and relationship. The third concept is Infrastructure management, which shows mainly how the element capacity is managed and third part relationship elements as partner, vendor and in some cases business demand division. The fourth concept is internal organization which shows exactly how the tangible capacity is organized in divisions with the element organizational unit and resource interaction in IT Process element. The last fifth concept is the financial Concept which implements very simple financial model with three main element; revenue, cost and profit. The profit is calculated as revenue minus costs.

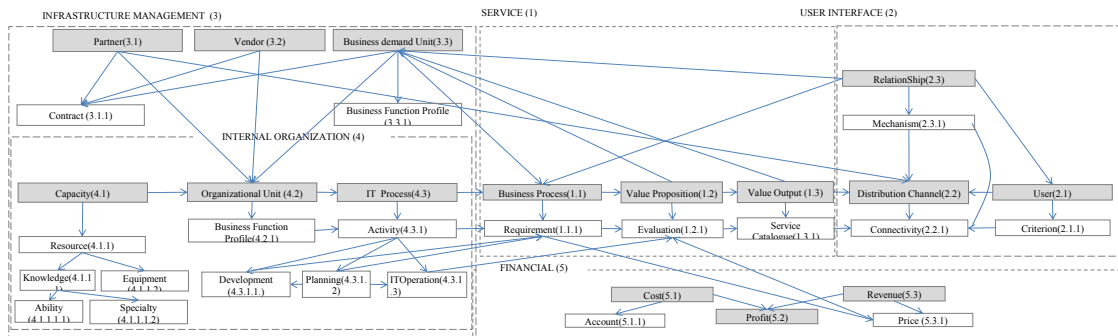


Figure 1: Graphical representation of the Conceptual IT model

Realization of Conceptual IT Service Provider Model with Ontology definition

(1) Concept Service

We assume that the Service is the value adding product of IT world. An essential element is business necessity for change, automating it through a Service. In other words the creative idea for implementation of IT Service is defined from the business process definition. It shows the high degree of integration between IT, business processes and goals. The concept Service includes two main elements: Business Process (1.1) and Value Proposition (1.2).

Business Process (1.1).

The Business Process is the first element of concept Service and describes the row and purpose of the business activities, the necessary changes and specific software requirements, operability and security. The starting phase of the IT Service creation is an initiating one where the idea should be quite clear and well explained. Usually the creation of the requirements starts from target process description and finish with detailed requirement with punctual description of the business process, their change and additional functionality inquired.

<i>Definition</i>	Business activities execute in predefined way with data-in from customer and produced product or business service, given to the customer.
<i>Part of</i>	Concept Service.
<i>Relation</i>	Business demand unit and Proposition of value.
<i>Set of</i>	Requirements(1.1.1)
<i>Attributes</i>	Id, refid, Name, Description, Schema, inherited form Requirement.
Requirements(1.1.1) <i>Definition</i>	Written definition of business process and necessity automation
<i>Requirements Relation</i>	Business demand unit; Value Proposition
<i>Requirements Attributes</i>	Name; Description; Target. Process, Phases, Budget

Value Proposition (1.2)

Value Proposition is the second element of concept Service. IT is the designed Service package with the relevant estimation and calculated possible returns on value. The Value Proposition is the third element of concept Service. IT is the operating Service with the relevant estimation of achieved functionality and calculated real returns on value.

<i>Definition</i>	Design of the service.
<i>Part of</i>	Concept Service.
<i>Relation</i>	User and revenue.
<i>Attributes</i>	Id, refid, Type, Inherits from Evaluation.
<i>Set of</i>	Evaluation(1.2.1)
<i>Evaluation (1.2.1) Definition</i>	The evaluation of service implementation.
<i>Evaluation Relation</i>	User and Revenue.
<i>Evaluation Attributes</i>	Type (technological, business), Operational cost, Initial cost.

Value Output (1.2)

Value Output is the third element of concept Service. IT is the operating Service with the relevant estimation of achieved functionality and calculated real returns on value.

<i>Definition</i>	Design of the service.
<i>Part of</i>	Concept Service.
<i>Relation</i>	User and revenue.
<i>Attributes</i>	Id, refid, Type, Inherits from Service Catalogue.
<i>It is</i>	Service Catalogue (1.2.1).
<i>Offer (1.2.1) Definition</i>	The evaluation of service implementation.
<i>Service Catalogue Relation</i>	User and Business Demand Unit.
<i>Service Catalogue Attributes</i>	Name, Description, Type

(2) Concept User Interface

User Interface concept includes 3 main elements: User (2.1), Distribution Channel (2.2) and Link (2.3).

User (2.1)

User of the Service is the first element of the Ontology concept User Interface and it is the end consumer of the Service.

<i>Definition</i>	User of the service
<i>Part of</i>	User Interface.
<i>Relation</i>	Value proposition and Link.
<i>Attributes</i>	Id, refid
<i>Set of</i>	Criterion
<i>Criterion definition</i>	Target user responds to prerequisites defined by conditions.
<i>Criterion Relations</i>	Offers.
<i>Criterion Attributes</i>	Inherits from Offers.

Distribution Channel (2.2)

Distribution channel is the second element of the Ontology concept User Interface. It is the way to approach end user. Example: branch network, internet, telephone, access device like bank cards.

<i>Definition</i>	User of the service.
<i>Part of</i>	User Interface.
<i>Relation</i>	Value proposition and Relationship.
<i>Attributes</i>	Id
<i>Set of</i>	Criterion(2.2.1)
<i>Criterion(2.2.1) definition</i>	Target user responds to prerequisites defined by conditions.
<i>Criterion Relations</i>	Offers.
<i>Criterion Attributes</i>	Inherits from Offers.

Relationship (2.3)

The Link is the third element of the Ontology concept Link. The Link is the business reason for customer relationship.

<i>Definition</i>	Customer relationship management
<i>Part of</i>	User Interface.
<i>Relation</i>	Value Proposition.
<i>Attributes</i>	Id, refid ,Type, Description.
<i>Set of</i>	Mechanism (2.3.1).
<i>Mechanism (2.3.1) Definition</i>	Mechanism is the business purpose and stage of Customer relationship.
<i>Mechanism Part of</i>	User Interface.
<i>Mechanism Relation</i>	Offers and Link.

(3) Concept Infrastructure Management

Infrastructure Management concept includes: Vendor (3.1), Partner (3.2) and Business demand Unit (3.3).

Vendor (3.1)

Vendor is the first element of Ontology concept Infrastructure Management. Vendor is every third part in relationship, managed by contract. The vendor is expected to do certain activity, usually not for a long period of time. When the relationship becomes long term, the vendor becomes a strategic partner and the financial result of the company is very much dependent on partner performance. The element contract is characterized with definition of the relationships, the purpose and type of the contract, period and cost. Examples of contracts are developments of certain code which is one of the most usual vendor activities, could be also analyses, project management and implementations.

<i>Definition</i>	All third part connected with production of the organization and defined for certain task and not for a very long time.
<i>Part of</i>	Infrastructure Management.
<i>Relation</i>	Capacities, Partner, Vendor, Business demand unit.
<i>Attributes</i>	Id, refid ,Name, Legal Type, and inherited from Contracts.
<i>Set of</i>	Contract(3.1.1).
<i>Contract(3.1.1) definition</i>	The contract between organization and vendor.
<i>Contract is Part of</i>	Infrastructure Management and Partner, Vendor, Business demand unit and with attributes Name, Description, Type, Clause, Term, and Price.
<i>Contract attributes</i>	Name, Legal Type, and Unique identification and inherited from Contracts.

Partner (3.2)

Partner is the second element of the ontology concept Infrastructure Management. The partner is a third party relation to the organization with big strategic importance. The relation is more delicate and should be treated like that with careful motivating clauses and approaches.

<i>Definition</i>	All strategically third parties connected to the production of the organization.
<i>Part of</i>	Infrastructure Management.
<i>Relation</i>	Capacity.
<i>Attributes</i>	Id, refid, Name, Legal Type, and inherited from Contracts.
<i>Set of</i>	Contract(3.2.1).
<i>Definition of Contract</i>	(look 2.3.1)

(3.2.1)

Business Demand Unit (3.3)

Business demand unit is the third element of the ontology concept Infrastructure Management. The unit is business organizational entity which is owner of business process and who requires the service. As usual business owner of the business process has the knowledge to formally describe in Requirement the needed change or new implementation of service.

<i>Definition</i>	The organization which owns the business process and orders the service.
<i>Part of</i>	Infrastructure management
<i>Relation</i>	Organizational units.
<i>Attributes</i>	Id, refid, Name, Legal Type, and inherited from Contracts.
<i>Set of</i>	Business function profile (3.3.1) or Contract(3.2.1).
<i>Business function profile(3.3.1) definition</i>	Business process owner or the business function which the unit is responsible to.
<i>Business function profile part of</i>	Infrastructure management and Business Demand Unit.
<i>Relation</i>	Organizational unit.
<i>Business function profile attributes</i>	Description, Type and Brand.
<i>Business demand unit attributes</i>	Name, Brand, Organizational level and Inherits from business function.

(4) Concept Internal Organization

The concept Internal Organization includes three elements: Capacity (4.1), Organizational Unit (4.2) and IT Process (4.3).

Capacity (4.1)

Capacity is the first element of the ontology concept Internal Organization. The Capacity is organized into organizational model and process. The types we distinguish are tangible and intangible. Tangible types of capacity are countable. The employee's volume measured in man-days, equipment like all devices connected to IT automation which includes communication devices as routers switches. Servers, storage, rack and rack equipment, backup and archive loaders, LAN cabling and desktops or laptops scanner, printers etc. devices, could be licenses and all system software. Intangible capacity is very difficult to be expressed and even more managed. Some of them are specialty of the employees and their technological knowledge. It is also their personal abilities. Usually the intangible capacity as technological abilities is the parameter for defining the organization in divisions and units. The example is .net programmers or quality testers or business analysts or strategic project management etc.

<i>Definition</i>	The capacity of the organization could be tangible and intangible. The tangible are mandays and equipment. Intangible is the knowledge, specialization and abilities.
<i>Part of</i>	Internal Organization
<i>Relation</i>	Organizational unit, Partner, Vendors and Internal organization. Infrastructure management
<i>Attributes</i>	Id, refid
<i>Set of</i>	Resources (4.1.1).
<i>Resource definition</i>	The resource defines the capabilities of producing and support services.

<i>Resources is part of Set of</i>	Capacity Knowledge(4.1.1.1), Equipment(4.1.1.2)
<i>Resources Relation</i>	Capacity
<i>Resources Attributes</i>	Name, Description, Type (Knowledge, Equipment).
<i>Knowledge(4.1.1.1) Definition</i>	The knowledge is built abilities and technological specialty as well as character abilities.
<i>Knowledge Attributes</i>	Name, Description, Type (Specialty, Ability).
<i>Equipment(4.1.1.2) Definition</i>	Equipment is the data center and everything used in automation plus the working place.
<i>Equipment Attributes</i>	Name, Description, Type (Server, Laptop...)
<i>Capacity Attributes</i>	Inherits from Resources.

Organizational unit (4.2)

Organizational Unit is the second element of ontology concept Internal Organization. For the process of service implementation organizational internal model plays a very important role. This is the reason that we add new element. The organizational unit is the second element of ontology concept internal organization. Organizational unit is the unit for most of the process. It is also business analysts units or project management unit which could be part of other business, not IT divisions.

<i>Definition</i>	Organizational unit follows the organization chart and is responsible for the execution of IT process.
<i>Part of Relation</i>	Internal Organization Infrastructure management, Partners, Vendors and Business demand unit.
<i>Attributes</i>	Id, refid
<i>Set of</i>	Business functions profile(4.2.1).
<i>Attributes</i>	Inherits from Business functions profile.
<i>Business function profile definition</i>	Business process owner or the business function which the unit is responsible to.
<i>Business function profile is Part of</i>	Infrastructure management
<i>Business function profile Relation</i>	Organizational unit.
<i>Business function profile Attributes</i>	Name, Description, Type, Count of emp., Strategic level

IT Process (4.3)

The IT Process is the third element of the ontology Internal Organization. It ensures the developments and operability of the Service. The Service could include several steps. The process is decomposed in several activities. For each of it are necessary concrete resources.

<i>Definition</i>	The process of Service creation. It is divided to two general types of activities development and IT operations.
<i>Relation</i>	Organizational unit, Business process
<i>Part of</i>	Internal Organization.
<i>Attributes</i>	Id, refid, Name, Description, Owner, Inherited from Activity.
<i>Set of</i>	Activity(4.3.1).
<i>Activity definition</i>	The process is composed of several activities ordered in a specific way, according to the followed practices. The man types of Activities are Development and IT Operations.
<i>Activity Relation</i>	Organization unit, partner or vendor.
<i>Activity Attributes</i>	Name, Description, Level, Type (Development IT, Operations).

(5) Financial Concept. The financial model is simple. There are three main elements; profit, revenue and cost. The revenue is turnover of the company. The profit is calculated as revenue minus costs. The cost is probably one of the most complicated elements, because it means all kind of costs, including investment and operational costs. The concept includes three elements Cost (5.1), Revenue (5.2) and Profit (5.3) Cost (5.1) is the first element, described as follows.

<i>Definition</i>	Different kind of financial obligations
<i>Part of</i>	Financial Concept
<i>Set of</i>	The definition of Account(5.1.1)t is different type of costs.
<i>Account attributes</i>	Name, Description, and Type.
<i>Cost attributes</i>	Type (investment, regular, salaries, operative...) Inherit from Account
<i>Example of Use</i>	The concept means different kind of investments and expenses. One of them could be the pay rate of developer.

Revenue (5.2) Revenue is the second element of ontology concept Financial.

<i>Definition</i>	The Revenue is the turnover of the company.
<i>Part of</i>	Financial Concept.
<i>Set of</i>	Service Price(5.2.1).
<i>Attributes</i>	Inherits from Service price and Legislative norms.
<i>Service Price Attributes</i>	Name, Description, Type, Range.

Profit (5.3). Profit is the third element of ontology concept Financial.

<i>Definition</i>	The earned money without taxes. In the model the profit is equal to revenue - costs.
<i>Part of</i>	Financial Concept.
<i>Attributes</i>	Name, Description and Tax.

The Definition of the Ontology in XML format is given in Appendix 1.

Conclusions and Future Work

The proposed model could be used in favor of good understanding between business units and IT service provider and helps in reducing risk of non-proper IT strategy and requirements, also preventing from financials losses. It could be very important in gaps analysis and process alignments. Having the model as a tool for business alignment with technology, the professionals may name the concepts and elements, and then fit the model into the roles of the process into model concepts. Such approach can help in overall understanding and vision of the whole process and target, thus assuring successful project implementation.

Next step could be defining ontology in OWL format which would be very convenient for application design and services.

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Appendix 1: Definition of Ontology in XML format

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Accuisition">
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