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Transformation of E-kanban to BPEL Using Information Retrieval Method For Searching

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Abstract: - Simple Transformer (SiTra) is a model transformation framework that is not just simple to use, but can carry out complex transformations. SiTra was initially intended to be a "way in" for the qualified programmer, to be able to use the conception of model transformation. The fundamental idea of SiTra is to put less attention to the specification language, maintenance and documentation features of transformation, by concentrating on the implementation of transformations. SiTra uses Java language for the specification of transformations. This eases the requirement to learn a new specification language or get to grips with a new tool and development environment. SiTra is prepared with a sturdy transformation engine to execute the transformation behind the scenes. This paper reports on a case study involving transformations from e-Kanban business process which is a particular vendor-managed inventory scheme that is based on the Kanban system for managing materials flow in a manufacturing facility which is based on the Ontology Web Language to Business Process Execution Language (BPEL), also to increase the retrieved information from e-Kanban, let the SiTra support on Scheme of Document Retrieval method.

Keywords: - *e-Kanban, Information retrieval, Web ontology language , web semantic*

I. INTRODUCTION

Web 3.0 is one of difficulty to define or metric for evaluating Web 3.0 , distinct definition of Web 2.0. Most people agree what Web 2.0 is an interactive and social web facilitating collaboration between people. This is distinct from the early web which was a static information dump where people read websites. So Web 3.0 is vary greatly, according to Amit Agrawal Web 3.0 is, among other things, about the Semantic Web and personalization. Focusing on the computer elements, Conrad Wolfram has argued that Web 3.0 is where "the computer is generating new information", rather than humans. Andrew Keen, author of The Cult of the Amateur, considers the Semantic Web an "unrealizable abstraction" and sees Web 3.0 as the return of experts and authorities to the Web. [1]

Semantic Web is a component of Web3.0 which is a web that is able to describe things in a way that computers can understand, the statements are built with syntax rules, the syntax of a language defines the rules for building the language statements, so semantic Web is all about describing things in a way that computers applications can understand it, it is not about links between web pages, also it describes the relationships between things (like A is a part of B and Y is a member of Z) and the properties of things (like size, weight, age, and price). "If HTML and the Web made all the online documents look like one huge book, RDF, schema, and inference languages will make all the data in the world look like one huge database"[2], also there are Web Ontology Language (OWL) which is a family of knowledge representation languages for authoring ontologies. The languages are characterized by formal semantics and RDF/XML-based serializations for the Semantic Web. OWL is authorized by the World Wide Web Consortium (W3C) and has fascinated academic, medical and commercial people.[3].There are three type of Web Service Discovery model Matchmaking, Broker and P2P, Firstly the matchmaking is heart of all discovery mechanisms is a Matching Engine that receives Requester description of ideal Web Service to communicate with advertisements of providers Matching Engine finds Web Service(s) that more closely fit the description of outcome is a flexible matching which shows the relation between advertisement and request, which use OWL-S UDDI integrates OWL-S Matching engine within UDDI provides capability search and leverages on OWL-S semantic representation. Secondly broker performs which both discovery and mediation for a client, here OWL-S Process Model describes an interaction between two parties: a provider and a requester. Finally P2P which there are no centralized registry, also no UDDI/Matchmaker, and no BROKER, the discovery based on message passing between peers, it's useful for ad-hoc networks and ubiquitous computing, also its support switch from file-sharing to service-sharing. This is as introduction on the some term must be clear before begin on the paper , in this paper there are collaboration between the business process for the organization and the web semantic to increase the profit and decrease the cost communication between the suppliers , also reduce the cost of the inventory by reducing the raw material and reduce the production line by letting the organization depend on the customization. In the context of the

topic, a business process or business method is a collection of related, structured activities or tasks that produce a specific service or product (serve a particular goal) for a particular customer or customers. It frequently can be imagined with a flowchart as a sequence of actions, also Supply Chain Management (SCM) is the management of a network of interrelated businesses involved in the ultimate provision of product and service packages essential by end customers [4]. Supply chain management extent all movement and storage of raw materials, work-in-process inventory, and finished goods from point of origin to point of consumption.

Furthermore, there is a Business Process Execution Language for Web Services (BPEL) [10] that offers an XML based-language to the formal specification of business processes and business interaction protocols. A BPEL file makes use of the WSDL file of involving services. Therefore, BPEL can be seen as an extension of WSDL that provides basic one-way or request-response mechanisms for the Web service intercommunication. BPEL is designed for articulating processes in depth, permitting composition and coordination of activities such as for sequential, parallel, iterative, conditional, compensational and fault execution . Thus, business process expressing interaction between services can be specified stylishly.

1.1 Metamodel for BPEL

The BPEL specification can be represented by an equivalent MOF compliant metamodel, As such, the metamodel specifies a number of model elements that are equivalent to XML constructs, defining various activity types, which allow sequential, parallel, conditional or repetitive processing of actions (See Figure 1).

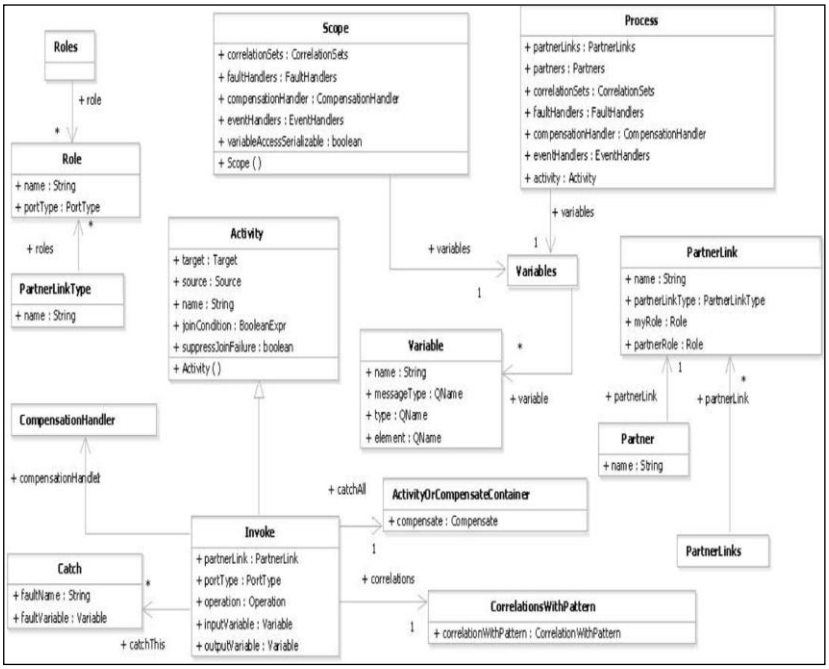

Figure 1: MOF compliant metamodel

In addition it defines a number of other features, such as variables, execution context (scope) and exceptions, allowing the creation of complicated and realistic processes, performing various invocation styles and data manipulations in an algorithmic manner.

II. RELATED WORKS

Different research papers discussed web semantic, a related one is "An Ontology for the e-Kanban Business Process" [5],they found that the large automotive manufacturers, including automakers and the manufacturers of principal automotive subsystems, make their products in large volumes. This means that the demands on their suppliers are fairly predictable over a long term, but subject to local peaks and valleys that result from variations in short-term demand and production schedules. As a consequence, the industry has found it expedient to develop vendor-managed inventory arrangements with many of the suppliers of commonly used parts and materials. In such a scheme, the principal manufacturer maintains only a few days or weeks inventory of the parts and keeps the supplier informed of the actual rate of consumption, and the supplier arranges to deliver parts and materials just in time to maintain the inventory level needed for immediate manufacture. This reduces the cost of space, time, personnel and equipment for maintaining the parts and materials inventory at the manufacturing facility. At the same time, it gives the supplier better information and better control over the replenishment process, which allows him to plan his production to a known customer demand, from this paper

applicant of anthology language done without any problem, so the similar system can have the same result also it's increase from the productivity of the system. From this point our research paper starts.

Another related work is" A Case Study in Integrating Multiple E-commerce Standards via Semantic Web Technology "[6], this paper demonstrated how Semantic Web technology can be used to ease integration of various e-commerce classification schemes. With some ex-tensions, the eOTD provide an excellent common vocabulary and OWL DL is expressive enough to relate classification schemes that have different levels of specificity and different assumptions about what a parent-child relationship means. Ideally, seeing suppliers and maintainers of standard classification schemes create their own mappings to the eOTD, or have them use a standard product ontology that is so mapped, but in the meantime it is possible for these mappings to be developed by a third party. This would reduce the cost of integrating such ontology with the FCS or any other terminology. The clear advantage is less ambiguous classifications and the ability to automatically interchange with other schemes include the main body and finding of your research. Change the heading of the SECTION 1 to that of yours. Choose the proper name/s in one or more sections as necessary.

The work that is closed to ours is done by the DAML-S consortium[7]. Our framework as well as DAML-S use the Semantic Web's key enabling technology of ontologies as their basis. In contrast to DAML-S, the underlying principles of our framework are the ideas of de-coupling and mediation. Furthermore, DAML-S misses important modeling constructs like the distinction between business logic and message exchange protocols. Thus, we allow for a more flexible framework including greater abstraction and encapsulation of proprietary business information. The vision is to establish a mediated P2P environment providing a maximum of efficiency and flexibility. A detailed comparison between DAML-S and our approach is provided in ebXML, being developed primarily by OASIS and the United Nations, approaches the overall problem from a workflow perspective. ebXML uses two views to describe business interactions, a Business Operational View (BOV) and a Functional Service View (FSV). The BOV deals with the semantics of business data transactions, which include operational conventions, agreements, mutual obligations and the like between businesses. The FSV deals with the supporting services: their capabilities, interfaces and protocols. Although ebXML does not concentrate on only Web services, the focus of this view is essentially the same as that of the current DAML-S effort. It has the concept of a Collaboration Protocol Profile (CPP) "which allows a Trading Partner to express their supported Business Processes and Business Service Interface requirements such that they are understood by other ebXML compliant Trading Partners", in effect a specification of the services offered by the Trading Partner. A Business Process is a set of business document exchanges between the Trading Partners. CPPs contain industry classification, contact information, supported Business Processes, interface requirements etc. They are registered within an ebXML registry, in which there is discovery of other Trading Partners and the Business Processes they support. In this respect, UDDI has some similarities with ebXML. However, in contrast to our work ebXML's scope does not extend to the manner in which the business documents are specified. This is left to the Trading Partners to agree upon a priori by the creation of a Collaboration Protocol Agreement.
Thus, we claim that for real-world deployment, B2B protocols have to support document standards, business protocols, packaging, sequencing and transport combined with powerful transformation, workflow and adapter technology.

III. DEPLOYED THE E-KANBAN BASED ON OWL DEPLOYED ON BEPL SERVICES AND USING INFORMATION RETRIVE METHOD FOR SEARCHING

Everyone is familiar with Darwin's principle of the "Survival of the Fittest", A common supply chain problem in manufacturing industry today is the breakdown in information flow the moment an order is transferred to the in-house production facility.
The customer agent is not informed about whether the order was completed on time, too early or too late – if at all, too often, this information comes via a customer complaint.

The application of E-Kanban permits the maintenance of low stock levels while simultaneously improving the capability to deliver. Material is requisitioned "just in time", and on behalf of, the subsequent downstream manufacturing station from the immediate upstream unit using a Kanban card, as example use of sensors in straight-through shelving that trigger a signal when the following container moves up, Now to make the system more effective can change the e-Kanban to ontology language

The problem: how the customer can read from e-Kanban which is based on OWL language using web services as BEPL. So we need Matching engine

At the beginning as a term SCHEME OF DOCUMENT RETRIEVAL is a method to read from e-Kanban system , this method work with three different approaches to document retrieval: vector representation, latent semantic indexing method (LSI), and ontology-based method as following:

3.1. VECTOR REPRESENTATION APPROACH

This well know approach is based on vector representation of document collection. First of all every document is passed through set of pre-processing tools (lower case, stop words filter, document frequency). Then a vector of index term weights is calculated as the document internal representation. These weights are calculated by most often used tf * idf scheme ij freq is the number of occurrences of term ti in document dj , N is number of

$$w_{ij} = tf_{ij} \times idf_i$$

$$\text{where } tf_{ij} = \frac{freq_{ij}}{\max_e freq_{ej}} \text{ and } idf_i = \log\left(\frac{N}{n_i}\right),$$

documents in collection, and ni is the document frequency for term ti in the whole document collection. Such a vector is then normalized to unit length and stored into the term-document matrix A, which is internal representation of the whole document collection. In order to find some relevant document to a specific query Q_ it is necessary to represent the query $\bar{Q}$ in the same way as a document $\bar{Q}$i (i.e. a vector of index term weights). Similarity between a query $\bar{Q}$ and a document $\bar{D}$i is computed as cosine of those two normalized vectors (document and query vectors).

$$sim_{TF-IDF}(\vec{Q}, \vec{D}_i) = \frac{\vec{D}_i \times \vec{Q}}{\left|\vec{D}_i\right\| \vec{Q}|}$$

3.2. LATENT SEMANTIC INDEXING APPROACH

LSI approach is based on singular value decomposition of tf-idf matrix A. By this decomposition three matrixes are computed .

A = USV T

where S is the diagonal matrix of singular values and U,V are matrices of left and right singular vectors. If the singular values in S are ordered by size, the first k largest values may be kept and the remaining smaller ones are set to zero. The product of the resulting matrices is a matrix approximately equal to A, and is closest to A in the least squares sense.

$$A \cong A_{SVD} \text{ where } A_{SVD} = U_K S_K V_K^T$$

In order to determine similarity between a query and approximate document vector i DSVD, we need to transform query vector to new feature space. (Original query vector is computed with tf-idf scheme as described above for vector model approach.)

$$Q_{SVD} = Q_{TF-IDF}^T U_K S_K^{-1}$$

And then we can compute similarity in the same way as before, i.e.

$$sim_{SVD}(\vec{Q}_{SVD}, \vec{D}_{i,SVD}) = \frac{\vec{D}_{i,SVD} \times \vec{Q}_{SVD}}{\left|\vec{D}_{i,SVD}\right\| \vec{Q}_{SVD}|}.$$

3.3 ONTOLOGY-BASED APPROACH

This part describes the approach that uses ontology for document retrieval purposes. For the experiments described below we did not consider type of relation in ontology for calculation of similarity between concepts. Moreover, we assumed that the set of relevant concepts to the query is known. But this condition can be achieved with any technique for assigning concepts from ontology to a query, e.g. based on manual assignment or based on synonyms to query terms, making use of Word net or other.

The way in which a query is processed by this approach is shown on the Figure 1. For a given query first appropriated concepts are retrieved - in our case manually from the user . Then the set of concepts associated with each document is retrieved from database. As next, these two sets are compared using simple metric, which expresses the similarity between a document $\bar{D}$i and given query $\bar{Q}$.

$$sim_{onto}(\vec{Q},\vec{D}_i) = \begin{cases} |Q_{con} \cup D_{i,con}| & if \ |Q_{con} \cup D_{i,con}| \neq 0 \\ k \end{cases}$$

where Qc on is a set of concepts assigned to query Q and Dc on is a set of concepts assigned to document $\bar{D}i$, and k is small constant, e.g. 0.1. Resulted number represents ontology-based similarity measure. Better results have been achieved when this number have been combined with some of the previous two retrieval approaches described above (i.e. LSI approach or vector model). The final similarity is then computed as multiplication, e.g.

$$sim(\vec{Q},\vec{D}_i) = sim_{onto}(\vec{Q},\vec{D}_i) * sim_{TF-IDF}(\vec{Q},\vec{D}_i)$$

- According to the following figure to the problem connect e-kanban with other web interface in this paper was chosen BEPL as a web services , to let BEPL contribute with e-kanban , must use Simple Transformer (SiTra).

SiTra is a simple transformation use any method in this paper SCHEME OF DOCUMENT RETRIEVAL to retrieve about data from the data base as seen figure 2.

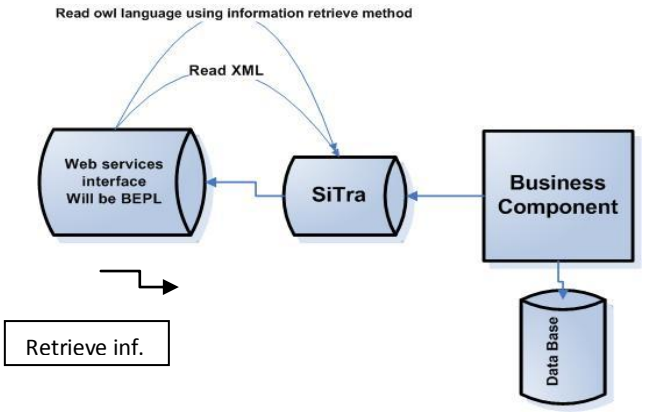

Figure 2: Read OWL language using information retrieve method

3.1.1 Mapping of Elements

The following tables depict the correspondence between some of the model elements of OWL-S processes. For example, Atomic Process in OWL-S, the element representing the most basic class of Web service processes, is mapped to a BPEL Process. The mapping also requires the creation of a number of other BPEL and WSDL elements so that the meaning of the output model corresponds entirely to that of the input. In addition to the main Process element, a Port Type, an Operation, a Partner Link Type, an Invoke and a Role must be created. The properties of these model elements must correspond to those of the source OWL-S Atomic Process. From the collection of inputs belonging to an Atomic Process, a single BPEL Input can be created, along with an associated Message and Variable. Each of the OWL-S Inputs corresponds to a single Part in the BPEL Message. OWL-S outputs can be converted to BPEL in an identical manner.

There are several examples in the table in which the OWL-S Process model element does not map to anything in BPEL or WSDL. For example, OWL-S precondition and result elements are used to incorporate semantic information regarding the change of state that occurs when the process is executed. Such notions have no equivalent in BPEL, hence it is not possible to map them to BPEL. BPEL does not support the representation of information of this nature, and thus no mapping exists for these elements. A key set of mappings from OWL-S to BPEL involves OWL Control Construct elements. These, in general, correspond to BPEL Activity objects and are used to describe the nature in which the components of a Web service process are executed. Both OWL-S and BPEL provide similar constructs for this purpose. For example, both languages contain a Sequence element, indicating that any processes contained within should be executed strictly in order. An OWL-S Sequence maps directly to a BPEL Sequence. Some of the other Control Constructs map to BPEL elements in a similar fashion. However, some of the OWL-S Control Constructs have no corresponding BPEL Activity. For example, the OWL-S Any Order construct indicates that its component processes should all be executed, but in no particular order. BPEL has no corresponding construct. It is possible, though, to model OWL-S Any Order elements as BPEL Sequence elements without affecting the functionality of the output BPEL model (this may

affect the efficiency of its execution, however). Therefore, the following table1 shows the corresponding BPEL element for an OWL-S Any Order to be a Sequence. A similar situation arises around OWL-S Choice constructs.

Table 1. Equivenlent mapping of OWL-S Process and BPEL elements

OWL-S Process	BPEL
<Process>	<Process>
<AtomicProcess>	<Process> + <PortType> + <Operation> + <PartnerLinkType> + <Role> + <invoke> Operation + PortType names must be consistent with the created WSDL file. **Note:** require an <invoke> call within <Process> tags and Operation + PortType names must be consistent with the created WSDL file.
[<input>]* (of Atomic Process)	<input> + <message> + <variable>
<input>	<part> (of the <message> created for all inputs)
[<outputs>]* (of Atomic Process)	<output> + <message> + <variable>
<output>	<part> (of the <message> created for all outputs).
<precondition>	**Note:** This does not really map, due to complicated representation of Preconditions in OWL-S.

So can transformation from information in OWL in e-kanban into BEPL information also according to term information retrieval, we can apply this term on SITra according to the SCHEME OF DOCUMENT RETRIEVAL above to increase the search speed.

The first paragraph under each heading or subheading should be flush left, and subsequent paragraphs should have a five-space indentation. A colon is inserted before an equation is presented, but there is no punctuation following the equation. All equations are numbered and referred to in the text solely by a number enclosed in a round bracket (i.e., (3) reads as "equation 3"). Ensure that any miscellaneous numbering system you use in your paper cannot be confused with a reference [4] or an equation (3) designation.

IV. CONCLUSION

This paper involves in transformation models of e-kanban which is based on Web Ontology Language (OWL) to BPEL, via our lightweight modeling transformation framework called SiTra. SiTra uses Java for the specification of the transformation rules, so this transformation help in deployed the services of e-kanban on BEPL ,also to let the system more effective use one method of information retrieval which is specific for ontology language which is SCHEME OF DOCUMENT RETRIEVAL that will increase the search and retrieve information from e-kanban, so that increase the speed and found the services .

In this paper we have presented the results of some experiments performed in order to evaluate retrieval efficiency of an ontology-based approach, which is implemented within the Webocrat system. We did a series of experiments with two other, frequently used techniques for information retrieval (vector model with tf-idf weight schema and latent semantic indexing model). The experiments on well known Cystic Fibrosis document collection have shown that ontology-based approach employed in the Webocrat system is very promising and may yield better precision-recall characteristics.

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