Proceedings of the Third Science Symposium – November, 2005
Faculty of Science, University of Ruhuna, Matara, Sri Lanka
3:35-41

Design-Assistant for eBusiness Collaboration Modeling

Perera C.G. and Jayaweera P.M.

Department of Computer Science, University of Ruhuna, Matara, Sri Lanka.
Correspondance: {champika, prasad}@cc.ruh.ac.lk

Abstract

Electronic Commerce or eCommerce is simply buying and selling goods and services electronically by consumers or by companies via computerized transactions. Though the eCommerce is the cutting-edge technology for today's businesses as a result of popularity of the Internet, the various electronic forms of trading between geographically dispersed business-partners were existed from several decades back. There is no single force to govern digital economy on the Internet, different groups develop various systems based on different technologies to run businesses over the Internet. As a result, people are experiencing integration difficulties of business systems developed based on such heterogeneous technologies.

Having realized these issues on "interoperability", there are several standardization groups actively working on different protocols for managing electronic business transactions for eCommerce Systems. eCommerce Systems development involves complex business collaboration modeling tasks with the necessary participation of wide spectrum of stakeholders. However a methodological or tools support that a designer can get with above standardization works are not adequately enough and still at very early stages.

In this position paper, development of a technology neutral framework that can be associated in analyzing, understanding and designing eBusiness Collaborations is proposed. The one main objective of this work is to develop a methodological support and a Designer-Assistant that can facilitate and that can use as a remedy to designers' burden in modeling eBusiness Collaboration for eCommerce Systems. This research work starts with an analysis of existing protocols for electronic business transaction management. Based on a common metamodel that can be developed through the above analysis, a methodology with a Designer-Assistant to design eBusiness Collaborations is planned to be achieved.

Introduction

With the growing interest and popularity, Internet has influenced and changed the way we work, the way we learn, the way we do business and has changed our entire lifestyle. We are experiencing these changes at a growing rate as Internet grows

exponentially. The Internet Economy Indicators reports that Internet economy grew at a 173.6% from 1999 to 2000 (IEI 2005).

Electronic Commerce (eCommerce) is the buying and selling of goods and services electronically by consumers or by companies via computerized transactions. Replacing manual and paper based business processes with electronic alternatives and by using information flow effectively in new and dynamic ways, eCommerce has speeded up ordering, production, delivering, payment for goods and services at a lower cost.

At the early stages there were many different proprietary legacy enterprise applications been developed to facilitate eCommerce activities on the Internet. As a result when the need has risen to communicate between different application that have been developed on heterogeneous platforms, "Interoperbility" issues came into existence. There are many on going activities to address these interoperability issues particularly under Enterprise Application Integration (EAI 2005).

However the current trend is to different organizations and groups of people and individuals getting together to develop eCommerce standards to over come interoperability issues. In the research work we will be studying and thoroughly analyzing many different but popular approaches to eBusiness Transaction Management that are commonly used and can also be considered as standards in the area. Below, few standardization works that have been subjected to our research analysis are introduced.

Among the various standardization activities around today in eCommerce, United Nations Center for Trade Facilitation and Electronic Business (UN/CEFACT) is leading with large participation from industry and academia (UMM 2001).

- UN/CEFACT - BCP (United Nations / Center for Trade Facilitation & Electronic Business) - (Business Collaboration Protocol)

Techniques and Methodologies Working Group (TMWG) of United Nations Center for Trade Facilitation and Electronic Business (UN/CEFACT) proposes UN/CEFACT Modeling Methodology (UMM) to model business processes and to support the development of existing and "The Next Generation" of Electronic Data Interchange (UN/EDIFACT 2005) for e-Business.

- OASIS - BTP (Organization for the Advanced of Structured Information Standards) – (Business Transaction Protocol)

The OASIS Business Transaction Protocol specification defines the protocol "in terms of abstract messages schematized in XML. It defines communications protocol binding to SOAP, but also allows the transport of BTP messages over other communication protocols. BTP is based on a permissive and minimal approach where constraints on implementation choices are avoided. The protocol also tries to avoid unnecessary dependencies on other standards, with the aim of lowering the hurdle to implementation" (BTP 2004).

- ebXML (Electronic Business using extensible Markup Language)

"ebXML (Electronic Business using eXtensible Markup Language), is a modular suite of specifications that enables enterprises of any size and in any geographical location to conduct business over the Internet. Using ebXML, companies now have a standard method to exchange business messages, conduct trading relationships, communicate data in common terms and define and register business processes" (ebXML 2005).

- BPEL4WS (Business Process Execution Language for Web Services)

"The Business Process Execution Language for Web Services (abbreviated to BPEL4WS) is a notation for specifying business process behavior based on Web Services. Processes in BPEL4WS export and import functionality by using Web Service interfaces exclusively. BPEL4WS provides a language for the formal specification of business processes and business interaction protocols. By doing so, it extends the Web Services interaction model and enables it to support business transactions. BPEL4WS defines an interoperable integration model that should facilitate the expansion of automated process integration in both the intra-corporate and the business-to-business spaces" (BPEL4WS 2005).

- RosettaNet

"RosettaNet is a consortium of major Computer and Consumer Electronics, Electronic Components, Semiconductor Manufacturing, Telecommunications and Logistics companies working to create and implement industry-wide, open e-business process standards" (RosettaNet 2005).

Research method

1. Purpose

As more and more businesses have been moved on to the Internet, there is ever growing demand for eCommerce Systems to support them. These systems need to have various functional features of different businesses with the assurance of quality of service that systems are supposed to offer, but developed rapidly to again competitive advantages. However development of eCommerce is very complex and time-consuming task with various types of stakeholder participation through out the development process.

Although there are several technologies for eBusiness transaction managements, the methodological and tool support at different stages of the development process of eCommerce Systems are not sufficient enough. Some attempts in this direction can be found similar to Jayaweera's BP3 (Jayaweera 2004). Therefore in the research work we will be mainly focusing designing phase of eBsuiness Collaborations Models that have been considered important. The idea is to come up with a common metamodel and to develop an Ontology (EM 2004, REA 2005, Manjith *et al.* 2005) that can be the basis for a unified framework to address Interoperability issues. As an application of such a framework, we believe that a Design-Assistant can also be implemented to facilitate eBuisiness Collaboration Modeling tasks.

2. Research Goals

As mentioned in the section 1, there are different standardization groups working on different approaches to eBusiness transaction management. These different approaches have resulted interoperability issues when enterprise applications are to be integrated to automate business processes. Therefore the central contribution of this research work is to come up with a unified framework to analyze and to interpret any business collaboration model, i.e. to design common metamodel and to develop a ontology.

As a fruitful realization of the usefulness of such a framework, we will be defining a methodology for business collaboration designing and a Design-Assistant that can help the eCommerce Systems development process.

3. Method

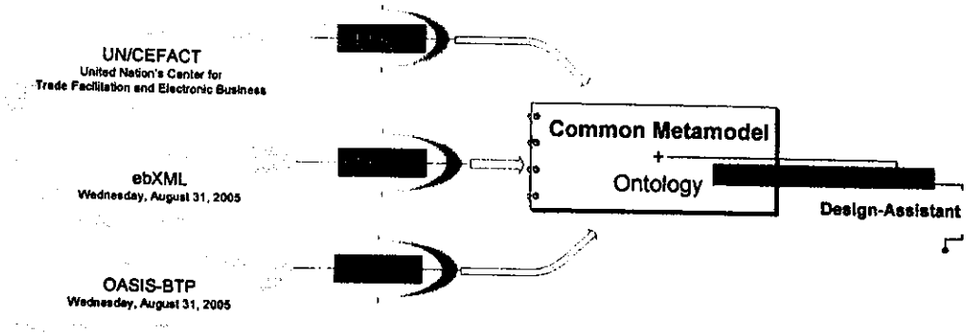

Figure 1 - The Research Method

The method that we are following to achieve research goals that we have tried to define above has been depicted in [Figure 1]. As listed in [Figure 1] to the left hand side, we have started this research work by thorough analysis and a careful study of the existing well known approaches for eBusiness Transition Management such as UN/CEFACT's, ebXML, OASIS-BTP, etc. The idea here is at the end of this study, complete and extract well-defined metamodels for different approaches.

Then we will be designing a unified framework by means of this common metamodel and the developed ontology together with a methodology to design business collaboration models. Another target that we are aiming within this research work is to develop a Design-Assistant with at least with partial tool support in reaching eBsuiness Collaboration Models for eCommerce Systems.

Expected results

One of the important expectations in this research work is to develop a unified framework to provide measures for the establishment of correspondences between different stages of eCommerce Systems development process and also to address aforementioned issues on interoperability with enterprise applications.

In the unified framework, there will be a common metamodel and a developed ontology for the eCommerce domain. The purpose of designing the common metamodel is to facilitate the transitioning between heterogeneous implementation technologies for eCommerce Systems such as the ones introduce in the section 1. The advantages of such a framework is two folded.

Firstly, based on a common metamodel, we could reach the final systems in any of the technology dependent implementation. Our objective of developing the Design Assistant is to reach much easily business collaboration models for eCommerce Systems in a technology neutral manner, but of course these could be readily translated into any implementation platform. With the existence of such a common metamodel will make this selection of implementation technology not an issue at all.

Secondly, models or systems developed for a particular implementation technology could be transformed into any other implementation via this common metamodel. This is possible basically through the semantics extraction with the assistant of a common metamodel. This is also an issues that has to be addressed in real world situations where different business are in the process of moving from their legacy systems into new and widely accepted technologies.

Concluding remarks

In this position paper, our central contribution will be a unified framework that could facilitate analyzing, understanding, interpretation and development of business collaboration models for eCommerce Systems. This framework could also opens up interesting approach to address interoperability issues that different businesses are facing with enterprise application integrations.

Another powerful application of this unified framework would be the Design Assistant. The Design Assistant will consist of well-structured methodology for Business Collaboration design for eCommerce Systems and also automated tool support that can facilitate eCommerce Systems development by taking away designers' burdens.

With this approach in eCommerce Systems development we believe that the framework and the Designer Assistant are capable enough to provide the tracebility of business requirement all the way down to design decisions of the lower level implementations. Further more, another important feature one could have with our approach will be flexibility. It will provide opportunities for eCommerce Systems designers with trying verity of design in very short development cycles to select the best to suite to the case under consideration.

References

BPEL4WS 2005 Business Process Execution Language for Web Services (BPEL4WS), Valid on 2005-08-30, http://xml.coverpages.org/bpel4ws.html

BTP 2004 OASIS Technical Committee Advances Business Transaction Protocol (BTP) Specification, Valid on 2005-08-30, http://xml.coverpages.org/ni2004-12-24-a.html

EAI 2005 Patterns and Best Practices for Enterprise Integration, Valid on 2005-10-18, http://www.eaipatterns.com

ebXML 2005 Electronic Business using eXtensible Markup Language (ebXML), Valid on 2005-08-30, http://www.ebxml.org/specs/index.htm

EM 2004 Enterprise Modelling Papers, http://www.eil.utoronto.ca/enterprise-modelling/papers

IEI 2005 The Internet Economy Indicators, Indicators Report, Valid on 2005-08-30, http://www.internetindicators.com/ keyfindings.html

Jayaweera 2004 Prasad Jayaweera, "A Unified Framework for e-Commerce Systems Development: Business Process Pattern Perspective (BP3)", ISBN 91- 7265-938-6.

Manjith *et al.* 2005 Gunatilaka M., Wikramanayake G., Karunaratna D., "Ontologies in Business Registries to Support e-Commerce", ICIM 2005.

REA 2003 REA Enterprise Ontology Source Page, Valid on 2005-10-18, http://www.msu.edu/user/mccarth4/rea-ontology

RosettaNet 2005 http://www.rosettanet.org/RosettaNet/Public/PublicHomePage

UMM 2001 "UN/CEFACT Modeling Methodology (UMM-N090 Revision 10), Valid on 2005-08-30, http://www.collaborativedomain.com/standards/index.htm

UN/EDIFACT 2005 United Nations Directories for Electronic Data Interchange for Administration, Commerce and Transport, Valid on 2005-10-20, http://www.unece.org/trade/untdid/welcome.htm