

The Format Converting/Transfer Agent and Repository System based on ebXML

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ABSTRACT

As introducing XML in EC-environment, various document formats have been used due to XML characteristic. Also, other document format except XML have been used to exchange EC-related information. That is, as increasing trading partner, as increasing exchanged document format and business processing being complex. So, management difficulty and duplication problem happened as trading partners increasing. And, they want to change plural business workflow to general and uniform form as defining and arranging BP(Business Process). Therefore, in this paper, we define XML as future document standard agreement and discuss about service system architecture and Repository. Repository stores and manages document standard, information related to Business Processing, Messaging Profile, and so on. Repository structure is designed to cover various XML standards. Also, we design system to support ebXML communication protocol, MSH, as well as traditional communication protocol, such as X.25, X.400, etc. and implement to exchange information via FTP.

Keywords: ebXML, Repository, BP(Business Processing Methodology), MSH.

1. INTRODUCTION

E-Business services, which are EDI System, WEB-based service, Payment system and the like, come to be used for various business fields. Although same business works, different Business Processing flow has existed for lack of work unification. Management difficulty and overlapping problem happened because numerous document standards have been defined and used by every trading partner as trading partner increasing. For this reason, it is necessary to standardize about E-Business, such as ebXML. If we use(apply) XML, then we have effect of increasing data efficiency and flexibility.[1][2][3][4][5][6]

Therefore, this paper defines XML as future E-Business Document Standard. We designs service system architecture and Repository as storage. Repository stores and manages information that is BP(CPP/CPA), CC, Messaging Profile, templates, and so on. Service system is linked with Repository and utilizes information within Repository when provides messaging service. The message information stored in Repository is based on EDI data and is designed to cover various XML standards. Also, we discuss about BP(Business Processing) that must be setting up before starting business

transaction. We discuss some services among the E-Business services, which are verification service for exchanged message, translation service from one format to another format and message exchanging through WEB.

This paper is constructed as following. It explains basic knowledge in section 2 and storage structure in section 3. In section 4, it explains essential prerequisite roles and available services, which is verification related with repository, translation and WEB service. Lastly, it explains conclusion and future study in section 5.

2. BASIC TECHNOLOGY

Standardization is beginning for the purpose of international open-environment to provide a reliable and integrated base between customers. Unification trend for exchanged message format go ahead with XML-based to overcome legacy EDI limitations. Therefore, ebXML(Electronic Business using XML) is introduced and defined by UN/CEFACT (United Nations Center for Trade Facilitation and Electronic Business) and OASIS (Organization for the Advancement of Structured Information Standards) for 18 months since 1999. ebXML not only simply defines XML language specification, but also covers from business process to communication.

ebXML is composed of 10 working groups(Requirement, Business Process Methodology(BP), Core Components (CC), Registry & Repository(RegRep), etc) to define specifications. Definition work is progressed as merging specification made by each working group.[14][15][16][17]

BP(Business Process Methodology) decides characteristic of business document and in detail defines the common role, relation and responsibility. Component is single-concept as some "building block" that takes business fragmentary information. Core Component presents at various business parts as Component concept and defines business role as combining common or general contexts RegRep(Registry and Repository) defines the domain(range) to reflect ebXML Business Requirement Specification and construction structure as defining business domain for Registry&Repository.

To do this, they show Actor Generation Model that applies to high-level use case of UML methodology. (Fig 1) represents Registry Information model. All registry object submitted at Registry&Repository have "one RegistryEntry" meta information.

ebXML TRP(Transport, Routing and Packaging) is composed of ebXML Enveloping, Transport, Routing, Packaging and Reliable Messaging. It defines ebXML Message Service

Protocol to exchange a secure and reliable message among trading partners. Communication protocol, such as HTTP, SMTP, etc, at ebXML message service is called MSH(Messaging Service Handler). MSH is based on SOAP and processed by W3C XML protocol working group. And MSH is composed of SOAP(Simple Object Access Protocol) and SOAPATTACH(SOAP Messages with Attachment). (Fig 2) shows the relation among internal modules of available ebXML message service structure and general structure and configuration of ebXML message.

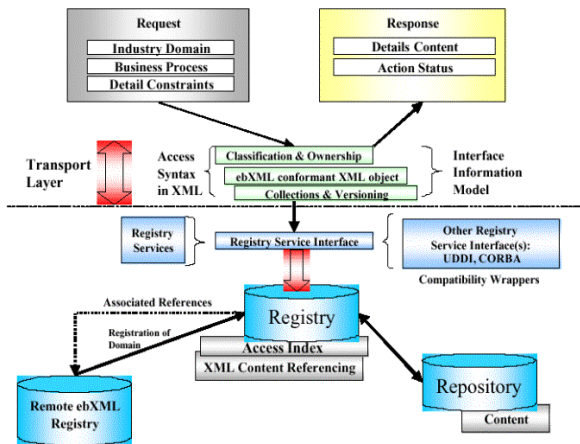


Fig. 1. Registry Information Model

overload, it may consider a common(central) Repository. Common Repository controls standard document format, style information and user-related information, business flow, etc. Currently, in Korea, KIEC(Korea Institute for Electronic Commerce) have been constructing Korea ebXML Registry and Repository and supporting to register, modify/delete and retrieve electronic messages. Also, KIEC provides technical infrastructure to handle business transactions between trading partners. From now on, KIEC will assist effectively EC standard foundation as reinforce some information to Registry and Repository. Its information is contents, business processing information and standard code, etc. (Fig 3) shows Korea ebXML Registry and Repository configuration. [14][15][16][17]

In this paper, we define and design a repository that stores and manages messages, standard format information and processing status. (Fig 4) shows a designed repository configuration.

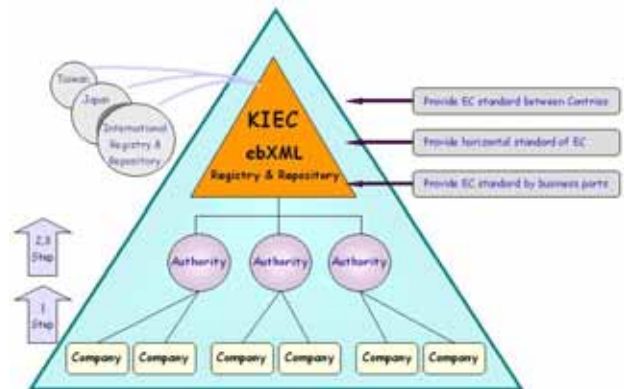


Fig. 3. ebXML Registry & Repository

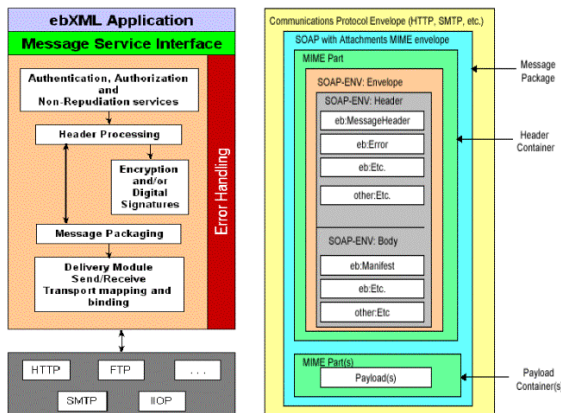


Fig. 2. ebXML Message

3. CHARACTERISTIC OF STORAGE

Repository Configuration

Repository for Internet Messaging service manages information, such as document format, style language, trading partner, etc. We consider following scenario in case user A send message to user B. User A use document format A' that is defined by A, and User B use document format B' that is defined by B(In case that is all users use individual document format). Then each user must store every document format for all trading partners in each user's repository. So to overcome this

Examples of Repository

Construction using OODB: XML is more and more using to Internet service as well as messaging system. XML is object-oriented language, so OODB is better than RDBMS in respect of flexibility and performance. OODB defines "store" as storage unit and keeps information in "store". OODB helps fast retrieval as set up "binder" like index concept of RDBMS.

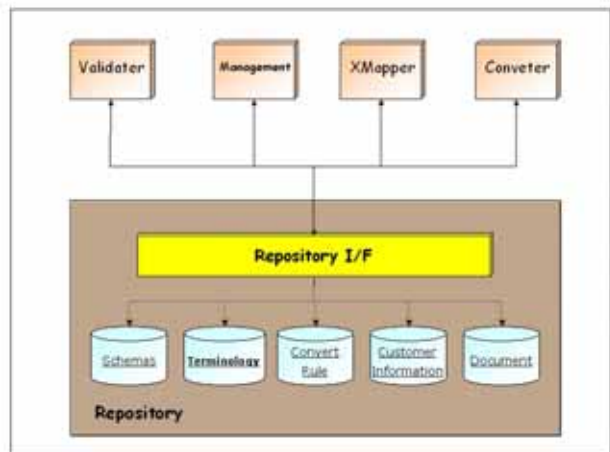


Fig. 4. Proposed Repository

Also document format information defines as “dictionary”. Repository manages it by version, by document name and by controlling agency. Exchanged messages between users are stored under three instances. Firstly, manage instance maintains processing status. Next message instance stores transferred message itself. Lastly, error instance maintains error code and status. At this point, basic store unit of messages is “XML”. (Fig 5) shows store(repository) structure using OODB and store contents. Used OODB product is Object Store’s “eXcelon” in this paper.

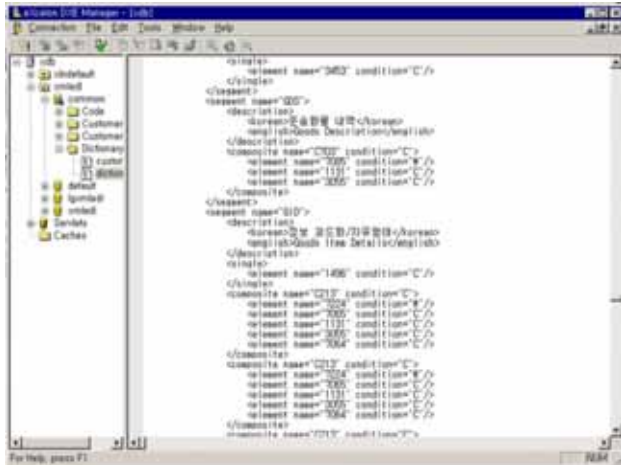


Fig. 5. Dictionary within ebXML Repository

Construction using RDBMS: It is more effective in using OODB as a repository at XML-based structure. But in case that it makes use existing system and new investment is a dedicate situation, it is a method to utilize existed RDBMS. However, RDBMS is not object-oriented system, it is impossible to store XML document itself.(New version may support this) So we store it as field-level to RDBMS by way of parsing XML document. And template information(DTD, schema, XSL, etc) may(should) be saved separately in file system

4. THE ESSENTIAL PREREQUISITE ROLES AND SERVICE

BP(Business Process Methodology)

BP provides transaction methods/steps to business partner in order to deal with each other in On-line. BP proposes the negotiable method between trading partners. That is, one trading partner shows all of oneself trading capacity, such as transaction method/steps, to another parties. Every trading party defines message exchange method as comparing oneself trading capacity with others.[14][15] CPP(Collaboration-Protocol Profile) is total set that is composed of trading method, transaction steps and security method collected by each trading partner. CPA(Collaboration-Protocol Agreement) is that one party negotiates the trading method/steps with another parties. These CPP and CPA include transport, messaging, security restriction and the association for Business Process Specification. (Fig 6) shows that CPP is processing flow when trading partners perform the business collaboration and CPA generation step by negotiation between partners, if CPP is registered.

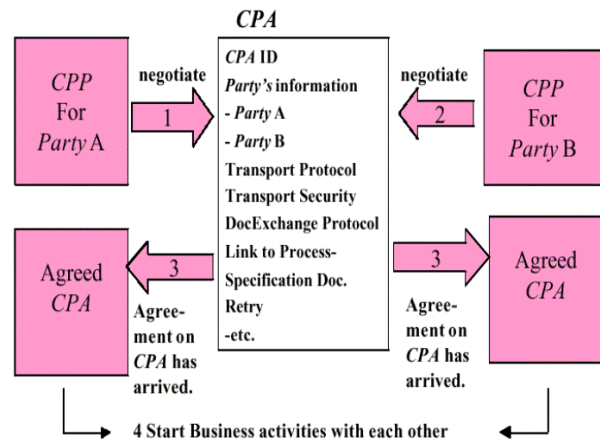


Fig. 6. Overview of CPA

Messaging Service

Business scenario may exist in various types.[15] In this paper, we discuss Hub-to-Hub and TP-Hub-to-Hub-TP type. Firstly, Hub-to-Hub type is a method that uses ebXML when transfer message between each other hubs. Each hub has independent service environment. Secondly, TP-Hub-to-Hub-TP type is a method that transfers message between communities using ebXML or one party is ebXML community and the other is non-ebXML community. In this case, service provider performs as message relay agent to transfer message between sender and receiver.[14][15]

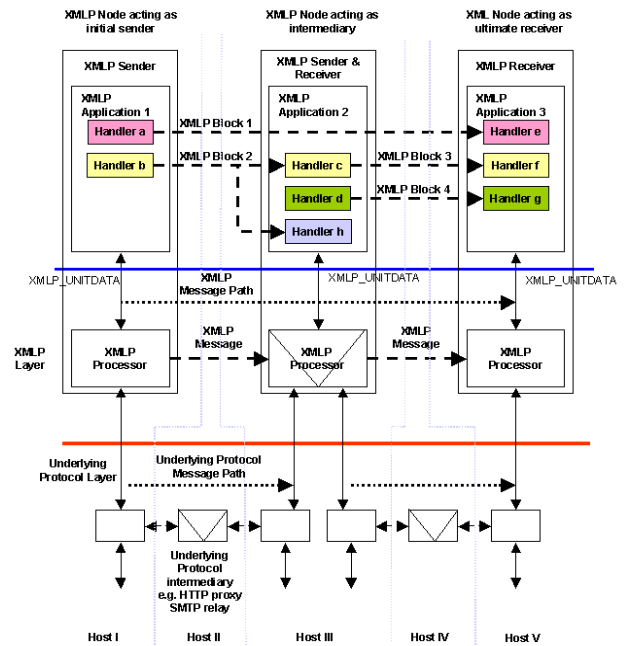


Fig. 7. Conceptual model of XMLP

XML Protocol(XMLP) includes common XML messaging technology as well as simple XML purpose(RPC between different systems using XML). That is, XMLP transfers XML block delivered from higher application and enveloped by XMLP layer. Underlying protocol may set up under each environment. Currently, MSH(Messaging Service Handler) is

terminology referred Messaging Service in ebXML. MSH is based on SOAP and use SMTP, HTTP, FTP, etc as underlying communication protocol. In this paper, we design service architecture to support MSH according to international standard trends. Moreover, we support X.25, X400(MSH : Message handling system) and TCP/IP for legacy service. (Fig 7) shows conceptual model of XML protocol and (Fig 8) shows entire service system configuration.[12],[15]

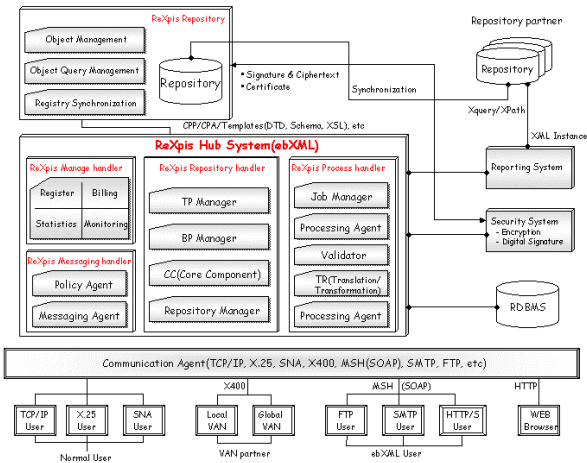


Fig. 8. Entire service system configuration

Services

Validation: XML have been using to make document that include structural/logical information and been covering the existing EDI disadvantages. To use XML, it must predefine document format, syntax and semantic. Behavior(Role) of Validator is to verify suitability and validity of message. Validator is composed of parser and checker module and is a program to check whether message correct to defined format, syntax, semantic. Firstly, XML parser uses standard parser, DOM and SAX.

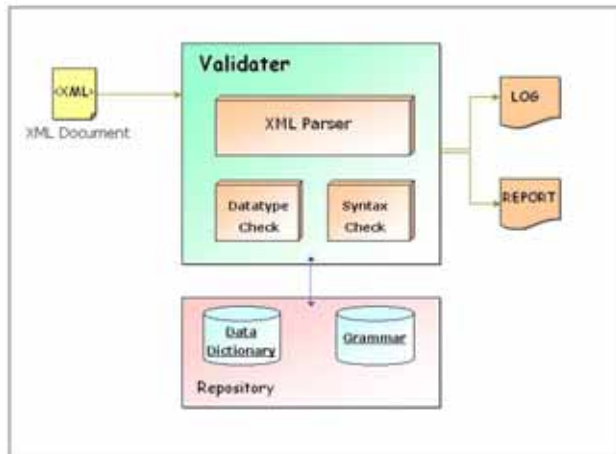


Fig. 9. Validator System Configuration

Parser decomposes input message into meaningful words and analyzes parsed XML words. Also, it checks data type, syntax structure and validity. It makes progress next processing in case of Well-formed XML and Valid-XML. At this time, information needed at processing is acquired from Repository.

Here, query language and response message format is XML or XML-related type. (Fig 9) shows Validator structure.

Converting: In current E-Business environment, various standards is defined and used to electronically exchange messages. A number of translators are used to support(cover) diverse standards(EDI(UN/EDIFACT, ANSI X12), XML, Private format, DB). Legacy translator supports only one-to-one format translation, for example, EDI-to-UDF, EDI-to-DB, UDF-to-DB, etc. So extra translator must be induced when new business is added or existing business is modified. Therefore, in this paper, we design Converter system to support inter-translation functionality as registering mapping information for various standards. (Fig 10) shows Converter structure.

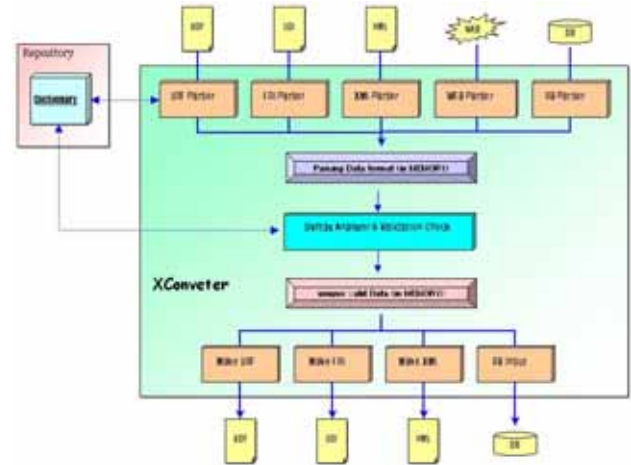


Fig. 10. Converter System Configuration

Converter is composed of parsing, analysis, validation, generation, logging and management information. Firstly, parsing module parses data by input scripts. If its message(EDI, XML, UDF) need to verification, then it call verification module and perform syntax and semantic checking. Analysis module selects suitable values among the data of input message. Mapping module sets values assigned by analysis module into relevant position according to output script. Even though the same input message, results may diverse by registering information. Generation module makes a result file by assigned information. At this point, converter system may directly interface with legacy system. If output or input format is DB, then this system can directly extract or store some value to appropriate DB(for example, Oracle, DB2, Informix). Lastly, logging module manages log information that is made by internal module of converter system. This information is very useful for status monitoring and data analysis. Processing data is user information and input/output scripts and management data of converter system.

File Transfer via FTP: There are existed various protocol when we had receive data from users or other VAN. At legacy system, X.25, TCP/IP, X400, HTTP is basically supported communication protocol. In this paper, we implement FTP communication agent to exchange data due to communicate with other service provider except VAN(X400). We have to set up VPN between service providers to assure security because we generally use Internet. (Fig 11) shows

available communication environment provided by this paper. And, (Fig 12) shows PDU flow when we use FTP.

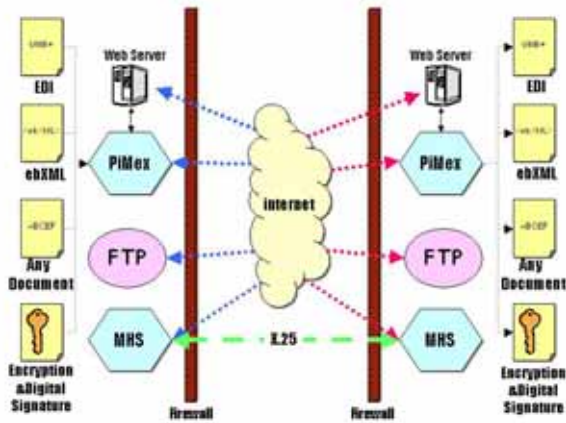


Fig. 11. Communication environment

→	'BS'	'C'	ENQ	Login_ID
←	'AK'	'BS'		
→	'F1'	null	null	NB
←	'FA'	'F1'		
→	'F3'	J	File_Size	File_Name
←	'FA'	'F3'	Null	File_Name
→	'F4'	J	J	Data
→	'F4'	J	Z	Data
→	'F4'	J	N-1	Data
→	'F4'	J	N	Data
→	'F5'	J	Null	
←	'FA'	'F5'		
→	'F6'	J	Null	
←	'FA'	'F6'		

Fig. 12. Communication PDU

5. CONCLUSIONS AND FUTURE STUDY

In numerous E-Business environment, management difficulty of standard information and overlapping problem happened as trading partners increasing(that is, increasing message standard managed by users). Also, business workflow wants to change from plural to general and unification. Therefore, this paper defines XML as document standard and designs Repository to store and manage information. And we discuss about service configuration linked and utilized to Repository. We discuss about BP(Business Processing Methodology) that must be setting up before starting business transaction. And, we implement some services among the E-Business services, which are verification service for exchanged message, translation service from one format to another format and message exchanging through WEB. As communication protocol, we implement FTP agent to exchange business data between service providers through VPN.

Lastly, although current system configuration is independent and separately architecture, it needs to co-operate(inter-work, interconnect) between Repositories or among the business trading parties. Future Study is expanding current architecture and collaborating with other business partners or service providers. And we will take part in XML standardization and be allowed to admit various XML standards.

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