Design of e-Catalog System using ebXML for connection Electronic Commerce and Enterprise Resource Planning

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Abstract - Recently, many companies and consumers are using Internet to sell and buy goods and manage their businesses. And for most companies, they have Electronic Commerce system and Enterprise Resource Planning (ERP) system. But the two systems manage separately and the data are not integrative. So it is hard to mangement the system alike and the costs may be higher than the system which has intergrated information. ebXML-based Electronic Catalog (e-Catalog) can provide intergrated information. In this paper, we took a manufacturing industry company for example. We planned to construct the e-Catalog System, analyze the products of the company as well as design e-Catalog System using ebXML to connect EC with ERPs.

Keywords: e-Catalog, Electronic Catalog, ebXML.

1 Introduction

Many companies have established their web sites as a business frontier even without any profit. In general, most commerce web sites can be classified into three categories: (1) the web sites provide information about the company, product or service; (2) the web sites provide well-organized e-Catalogs with function to help users to browse products; (3) the web sites support transaction functions in addition to e-Catalogs for on-line trading. However, many web sites are loaded with a large amount of information, especially the e-Catalogs in electronic shopping malls [1].

e-Catalog means supporting system to show and search product information that customers want whenever and wherever through Internet, changed from paper to digital form. The e-Catalogs are rapidly becoming an important part of EC. Applications developed to facilitate both B2B and B2C transactions are highly dependent on their e-Catalog components in order to communicate with product information and content to end customers [2].

Especially, the manufacturers must send their product information to every shop that carries their products. This has to be done again for every new product or modification [3].

Recently, many companies and consumers are using Internet to sell and buy goods and manage their businesses. And for most companies, they have Electronic Commerce system and Enterprise Resource Planning (ERP) system. But the two systems manage separately and the data are not integrative. So it is hard to manage the system alike and the costs may be higher than the system which has intergrated information.

In this paper we designed a ebXML based e-Catalog system which applied can be to the manufacturing industry for the appropriate product expression of dynamic environment and the activation of EC. Ir this paper we explore previous research on e-Catalog from the literature, analyzed company's product structure and designed product structure, databases and interfaces.

2 Related Works

2.1 Electronic Catalog

Methods to compose e-Catalog system can be divided into Single Server, Virtual Catalog, Mediator, Central Repository and Hybrid model [4].

2.1.1 Single Server Model

Single Server Model is the form that the existing shopping malls are taking now. Software to implement electronic catalog system of this model inc udes LiveCommerce, developed Open Market, StepSearch of SAQQARA and so on.

2.1.2 Virtual Catalog Model

Virtual Catalog Model is proposed in the collaboration of Center for Information Technology (CIT) in Stanford College and Catalog Working Group of CommerceNet. It can abstract product information using catalog of wholesale merchant as catalog connection of many producers. That is, electronic catalog is constructed by

each producer, keeps up the newest information always, shows information in the virtual catalog platform of wholesales according to information retrieval of customers and executes payment process. In other words, database of electronic catalog system is dispersed and it shows information to customers using single access point.

2.1.3 Mediator Model

Mediator Model, similar to Virtual Catalog Model, is the definition derived from digital library. It has mediator, which can integrate electronic catalog, as suggested by the Information Management Research Institute in St.Gallen College, Sweden in 1996.

2.1.4 Central Repository Model

Central Repository Model is what has catalog repository in central. It is possible to upload and download the information about each shopping mall and product maker. And it is the form that the manufacture industry remotely registers and modifies product information in server, the management company of electronic shopping mall operates electronic catalog system to download product information, personal buyer searches electronic catalog through internet. The most important features are as follows: one is operating system for electronic catalog management in the center; the other is making research in division system of network the time of implementation of shopping mall.

2.1.5 Hybrid Model

Hybrid model uses mixed-form. This model enables the companies to develop e-Catalog system by itself.

2.2 ebXML

As interest in electronic commerce rises and advantage of XML's data processing ability gets into spotlight, many organizations have tried XML e-Business standardization. As a result, tens standard came into being confusion added. ebXML is global joint initiative of the United Nations (UN/CEFACT) and OASIS, developed with global participation for global use.

<Table 1> shows ebXML components. ebXML is consisted of "Business Process", "Core Components", "Registry/Repository", "Trading Partners", "Transport/ Routing and Packaging".

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[6].

Component	Specification
Business Process	This is to define how business processes are described. The specification for business process definition enables an organization to express its business processes so that it can be understood by other organizations. This enables the integration of business processes within a company, or between companies
Core Components	This is define reusable components that can be applied in a standard way within a business context Core Components are defined using identity items that are common across all businesses. This enables users to define data that is meaningful to their business while also maintaining interoperability with other business applications
Registry / Repository	For the user (application) it stores company profiles and Trading Partner specifications. It gives access to specific business processes and information models to allow updates and additions over time. For the application developer it will store not only the final business process definitions, but also a library of core components.
Trading Partners	This defines the technical parameters of the Collaborative Partner Profiles (CPP) and Collaborative Partner Agreements (CPA). This captures critical information for communications between applications and business processes and also records specific technical parameters for conducting electronic business.
Transport / Routing and Packaging	This defines the set of services and protocols that enables electronic business applications to exchange data. This include common protocols such as SMTP, HTTP, and FTP

Table 1. ebXML components

3 Analysis

We selected Company S that is a domestic manufacturer which produces iron display stand, gondola, barbecue grill, etc. We analyzed the present catalog system and recognized the problems in it.

Customers of the Company S are divided into individuals and corporations.

Products of the Company S are changing frequently. Because they are composed of many low-level products and parts, and the final product appears in drawing by other product when parts, low-level products, sizes, colors or materials change. A product is composed of pars and

low-level products, which are composed of parts. It is appeared as the other product in drawing, when changing some parts, colors, sizes, or etc. And they are assembled by technician in the selling agent of customer, because that display stand is big and heavy. So, customers need to show final product, assembly process, assembly drawing and examples.

They searched public information of product using HTML based e-Catalog systems that are developed from paper catalog until now. Thereby, they are improved that "Increase of business processing time by manual processing at catalog manufacture" and "Catalog production cost increase by product alteration". But, it is being made by display based HTML that is not based data processing that found some limitations as a result. The biggest problem was "It doesn't connect with another system" among these.

4 Design

The proposed model is a Hybrid model that is composed of Single Server model, Mediator model, Central Repository model.

Here, Single Server model offers interface that can provide web based service. And by the interface we can see products in the form of general shopping mall.

Mediator model did make e-Catalog system to act as mediator that can integrate two systems using product information between shopping malls (electronic commerce) and ERP systems.

In this paper we put central server into company S using Central Repository model so that all information may be converged on the Server.

<Figure 1> shows proposed Hybrid model.

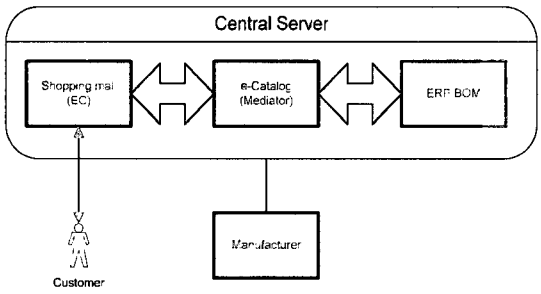

Figure 1. Hybrid Model

4.1 Database Design

Display for corporations has several types according to their shape; each type has final goods, which are constituted by low-level products and parts. There are 'Cat_table' to register directories, 'Cat_goods' and 'Cat-Unit' to show products and parts in the directory. Two tables make product and part list in directory. And we designed 'Unit_size' table for dynamic change for product size. There is 'Product' table to register product information in product list and it shares with product data in BOM system. And there is 'Sales' table to connect Shopping Mall. We designed database that did generalization by according to category of product and normalization to third normal form. <Figure 2> shows database schema of the e-Catalog system.

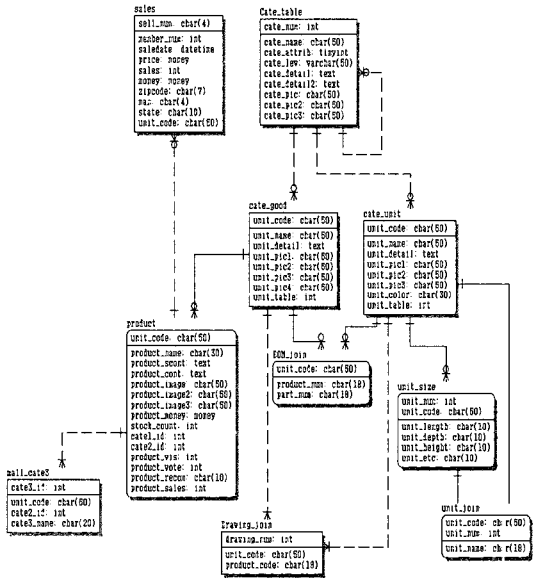

Figure 2. Database Schema

4.2 System Design

EbXML's registry offers e-Catalog system by operating the database. It manages meta data about e-Catalog's data, and offers interface for data storing and querying. Also it offers registry interface to BOM, ERP Server and Web Service Server. Registry interface is used to provide user interface. We designed user interface to serve in BOM,ERP Server for internal user and in Web Service Server for external user. <Figure 3> shows system's configuration.

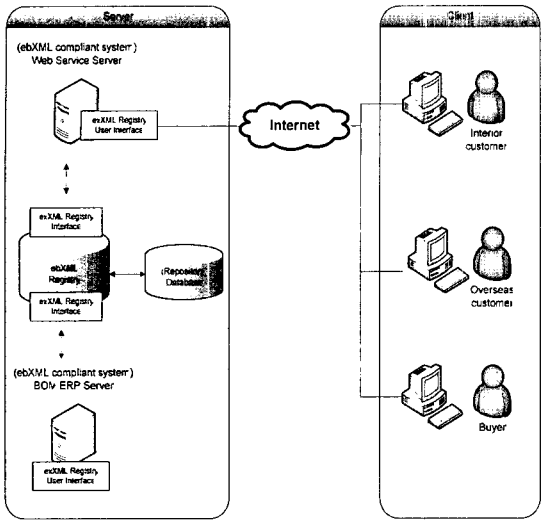

Figure 3. Configuration of the System

5 Conclusions

The e-Catalog system is the media which can bring companies into communication with customers. If the system can be implemented, many customers will obtain more or less the product information they want. So, we designed e-Catalog System using ebXML to connect EC with ERPs.

The Company S is propelling the development of information, and it is embodied by EC. We implementing the e-Catalog system is for this goal. The e-Catalog system has some advantages: short period of advertising new products, reduction of production cost, the globalized advertisements and the strengthening of competitiveness among the company.

ebXML-based e-Catalog can provide integrated information. Various applications in company by ebXML's patency may become possible construction of flexible solution and can connect between applications. We planed e-Catalog system that becomes basis of priority EC system for connection EC system with ERP system later.

In the future, we plan to implement the e-Catalog system and to expand this research into interrelationship between various Information systems. And we expect the company S should benefit by constructing of the e-Catalog system.

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