5th INTERNATIONAL CONFERENCE
TRANSPORT SYSTEMS TELEMATICS TST'05

ZESZYTY NAUKOWE
POLITECHNIKI ŚLĄSKIEJ 2005
TRANSPORT z.59, nr kol. 1691

global data synchronization,
GDSN, GDD, GS1, GTIN, GLN

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IMPLEMENTING GLOBAL DATA SYNCHRONIZATION MODEL FOR PLANNING DECISION IN SUPPLY CHAIN

The performance of a supply chain depends critically on how its members coordinate their decisions. The Global Data Synchronization (GDS) model was established to define the processes and standards by which information can be cleansed and synchronized. In this paper, the GDS model is described as the Global Data Synchronization Network (GDSN), a network of interoperable data pools, a set of global standards for logistics, buying and sales decision support.

WDRAŻANIE MODELU GLOBALNEJ SYNCHRONIZACJI DANYCH W CELU WSPIERANIA PODEJMOWANIA DECYZJI W ŁAŃCUCHU DOSTAW

Sprawność łańcucha dostaw istotnie zależy od sposobu koordynacji decyzji przez ich uczestników. Aby usprawnić te procesy wymiany danych, stworzony został model Globalnej Synchronizacji Danych (GDS), za pomocą której dane zostają wyczyszczone z błędów i synchronizowane pomiędzy stronami transakcji. W artykule model GDS został przedstawiony jako Globalna Sieć Synchronizacji Danych (GDSN), w której współpracują elektroniczne katalogi, wykorzystujące wiele globalnych standardów na potrzeby wparcia decyzji zakupu, sprzedaży i dystrybucji.

1. INTRODUCTION

Along a supply chain, various decisions have to be made continuously: which product should be produced first, whether to produce goods on stock or to customer orders, or with which companies cooperation should be established. There is a generic term for the whole range of decisions in the supply chain: planning the design of the supply chain, the mid-term coordination and the short-term scheduling of the processes. As the time horizon for planning decisions decreases, the requirements for up-to-date and accurate data about products and companies substantially increase. In addition to production and distribution companies, there is no one single production planning concept, such as material requirement planning or demand requirement planning, which can cover the large variety of planning problems that arise in practice. Different types of production processes, e.g. job shop, batch flow, assembly

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or continuous processes, imply particular requirements for planning. Today apart from the popular Enterprise Resource Planning software, more sophisticated concepts like Advanced Planning Systems (APS) can be implemented in companies. It enables quality production to be computed, and draws up scheduling and distribution plans to increase the efficiency of the whole organization. APS are mainly based on recent achievements in Operational Research and artificial intelligence, which make it possible to analyze many more constraints and unknowns than any experienced planner could take into consideration.

A consumer goods manufacturer often produces standard products with low volume, weight and value per item that are sold to the final customer via typical shops: a grocery, a retail chain or an electronic store. Such products typically have a rather long life cycle, but may have different shelf lives varying from a few days to a few years. In addition, a consumer goods manufacturer often produces a few related product types, which are sold in many variants, sizes and shapes of packaging. The purchasing decisions at every stage of the supply chain are driven by the demands that start at downstream facilities (customers). According to whole process of decision making, there are some basic things that have to be defined: when, with whom, where and what companies have to trade. The whole process can be made more complicated by huge numbers of upstream facilities (suppliers) which can deliver tens and hundreds of different types of product on different conditions. The first thing to improve trading partners' cooperation efficiencies is the standardization of types of data and business messages.

2. DEMAND OF INFORMATION SHARING

Retailers, manufacturers and distributors have recognized the importance of working more closely together to improve operational efficiency and service levels. Moreover, as competition becomes fiercer and margins continue to shrink, the way information is managed and shared is becoming a critical issue.

Traditionally, manufacturers, retailers and distributors have exchanged initial product information using manual, paper-based processes. In Poland, it is still popular that even a big retailer chain is still using a well-known paper product cart form in their purchasing department. The current research done by The Institute of Logistic and Warehousing shows that the ten major supermarket chains collect different sets of attributes and in many cases they expect different format and definition of these attributes. This information is rarely, if ever, updated as a product's attributes are changed over time. Thus, even when ordering or invoicing via electronic data interchange (EDI), companies experience inaccuracies as they conduct transactions based on older product data that does not resemble current product transactions. This has led to inefficiencies, errors and duplicative labor efforts among trading partners.

To deal with the lack of standardization of business information, organizations expend effort in several ways, related to both lack of information and erroneous information. The paper-base processes for collecting data of products do not protect the customer from receiving erroneous data form their suppliers. In addition, correction activities are carried out when someone detects an information error and takes action to correct the error. This process of correction very often starts when different products to what was previously ordered arrive at the customer. This process of correction repeats very often, leading companies to start working on improving it. It was very obvious that the solution had to be clear to all the suppliers.

3. BUILDING DATA SYNCHRONIZATION MODEL

Many big retail chains and global producers have had the power to create their own extranet which suppliers must use. Others have banded together to create joint solutions which led to the establishment of a solution provider for data exchange. The Worldwide Retail Exchange and Transora companies was created for this purpose. Suppliers also can send their data to a managed service provider such as UDEX in the United Kingdom, SINFOS in Germany, ECCC in Canada, EANNet in Australia, UCCnet in the United States and EANIC in Poland. Primarily, all these managed service providers base their solutions on standard formats required by the retailers, producers and distributors.

While all these developments have created some efficiencies in the data synchronization process, the retail industry has concentrated on a multiplicity of data standards and a confusing tangle of methods for transmitting the data. For suppliers dealing with ten retailers, this means producing data in ten slightly different ways, according to ten slightly different schedules. On the other hand, for a retailer with ten suppliers, it is a headache to deal with data coming in ten different formats through ten different routes.

The implementation of the Polish electronic catalogue EANIC in Poland follows the same pattern. Suppliers are forced by the largest retailers to prepare product information structure data in dedicated formats. Producers spend ample time collecting and arranging the same basic sets of product data separately for every retailer. The promotional activity and changes in product description have to be managed separately for every buyer. The last report done by Metro Polska for ECR Director Forum shows the 28 percent of electronic transactions contain some form of incorrect or inaccurate product data.

Many key producers, distributors and suppliers created the Global Commerce Initiative (GCI) to better meet the needs and expectations of consumers around the world by ensuring the availability of a consistent, voluntary, global supply chain standard. GCI aims to facilitate global supply chain efficiency and effectiveness, and consumer value creation, through cooperation driven by manufacturers and retailers operating on a global level. A global standards-based data synchronization model, the Global Data Synchronization (GDS) vision, has emerged as the industry's answer to improving internal operations and providing better expectations for consumers and to meet consumer expectations?

The GDS vision is enabled by a range of global standards managed by the GS1 international organization, the technical and organizational infrastructure called Global Data Synchronization Network (GDSN). GDSN is a federation of interoperable, certified data pools: a global registry which all is built on the range of standards established through the Global Standards Management Process (GSMP). The true power of this vision lay in the user driven and guided development of standards which arise from market requirements. Around GDSN vision there are many technical, business, standardization and operational task groups. Their gather many people from retailers, producers, distributors, solution providers and members of organizations. All these people have the opportunity to introduce new requirements or to vote for changes in the current standard by defining a new 'Change Request' to the GSMP process.

Nowadays, the GDSN model is a very fast growing live global system where every day users change or extend the current standard via the new 'Change Request'. Every six months, all the 'Change Requests' and the results of the task group's projects are converted to a new version of the GDS network model. It enables the establishment of new global business

standard rules for all trading partners around the world. Currently the task group is working on new industry sector standards to exchange attributes and business messages about toys and media. All the data pools involved in global synchronization have to go through a certification process. This gives a guarantee for trading partners connected to their data pool: that they will understand each other and communicate by new standards rules.

4. DATA SHARING CHALLENGES

The sharing of product, service, location, price and promotion information is at the core of trading partners' collaborations. However, in today's marketplace, the data exist within enterprise systems and the process for sharing that data with trading partners is often flawed. Manufacturers often communicate item and price information to retailers manually and in an ad hoc manner. Retailers are rarely consistent in the new item introduction and price data collection process. This results in suppliers relying on many methods to support many different retailer requests. Inaccuracies in retailer catalogues lead to purchase order errors, purchase order or invoice mismatches and, eventually, invoice deductions.

Trading partners are beginning to demand system-to-system synchronization of product, service, location, price and promotion data from their partners. All the data in GDSN model are divided to two types of master data: neutral data and relationship-dependent data. Neutral master data is that which is generally shared between multiple partners and which is relationship-independent. It can be split into three categories:

- Core product data – core data attributes that apply to all instances of any product (e.g. description, brand name, packaging, dimensions, etc.)
- Category specific data – data attributes that only apply to specific product categories (e.g. the color, grape and strength of bottle of wine)
- Target market data – data attributes that are specific to production in a particular market (e.g. packaging indicators in a specific country)

Relationship-dependent data includes attributes that concern all terms bilaterally agreed and communicated between trading partners such as marketing conditions, price information and discounts, locations, agreements and more.

In GDSN each set of data is uniquely identified by the Global Trade Item Number (GTIN) and the Global Location Number (GLN) for Party details. For product catalogue management purpose, a product cannot be uniquely identified by its GTIN. There are many business cases where there can be a lot of target specific date for several data owners of the same product. Therefore the unique identification of a trade item in a product catalogue is achieved by the combination of three attributes: GTIN, GLN of a data owner and the Target Market.

In figure 1 there is a data model of the attributes related to trade items implemented in the Polish catalogue EANIC. It is created according to the Global Data Dictionary (GDD) specification and recommendation. Each trade item is identified by GTIN, GLN and the Target Market, and have to have a Trade Item class, belong to one Global class and have one target market default set values. This model has consistent attributes for all local and global markets. When a producer registers his product in the EANIC catalogue he creates one Global class for every trading partner. Any distributor who makes his catalogue offer cannot change any value of the attributes in the global class. He can make his new catalogue product item attributes in a the Trade Item class. A distributor can describe his individual offer to every

trading partner in the Dependant Attribute classes. . The Global/Local class contains all attributes specific to the market and is created by the producer or product owner.

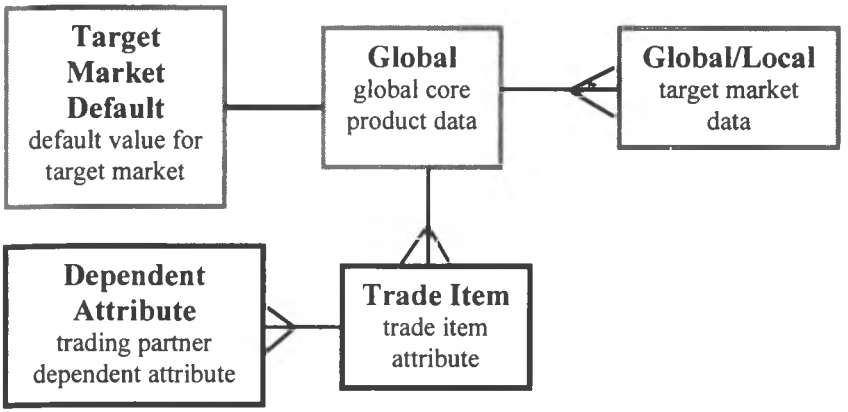

Fig.1. Interrelation of classes in the Polish catalogue EANIC

In addition, there is catalogue support for storing product-packaging hierarchy. Each level of the item hierarchy is described via a set of master data relevant for the level type, such as consumer unit and orderable unit. Producers and distributors can precisely describe dedicated attributes for consumer products, distribution units and orderable units. On the other hand, a retailer can find proper data about an orderable unit, the minimal orderable amount and logistical data for the transportation of products such as pallets. Due to the direct link between the product packing hierarchy, the retailer can take data about the consumer unit required for the ultimate consumption point.

5. IMPLEMENTING EANIC CATALOGUE IN MAKRO POLSKA

On the Polish market there is only one electronic catalogue built according to the GDSN model. It is Internet application accessible by popular web browsers, supported by state-of-the-art, powerful ORACLE database and controlled by secure Internet protocol (SSL). EANIC supports many GS1 standards which enable data synchronization between trading partners on both the local Polish and the international market.

Implementation of the EANIC catalogue for the Makro Polska retail chains shows the importance of defining the base unit, consumer unit and logistical unit of the product. The retailer wants to know what is the logistical unit is, and what the dimensions of the pallet are. This data encourages decision makers to issue proper orders with the right amount of products, in order to optimize storage space for new products. Makro Polska expect dedicated compound trade item units from their suppliers. This product is produced only on request for Makro Polska and is exclusive to this retail chain. It is built on base units like bottles of water, which are public trade items available from the whole target market. Customers of Makro

Polska typically unpack Makro units and resale them in their shops. It is possible for them to connect with the EANIC catalogue and load public data of these base units directly to their sales systems. This real example shows how dedicated private and public data can be synchronized and loaded from a catalogue. In figure 2, a supplier can publish Electronic Form Product data directly to the catalogue. Supplier GLN2 can create a private publication only for retailer GLN3 and Makro Polska can then load it. In addition, Makro Polska can create subscription criteria for only GLN1 and GLN2. Whenever supplier GLN1 or GLN2 create new publication or make any change to current trade item, Makro Polska receive notification about it.

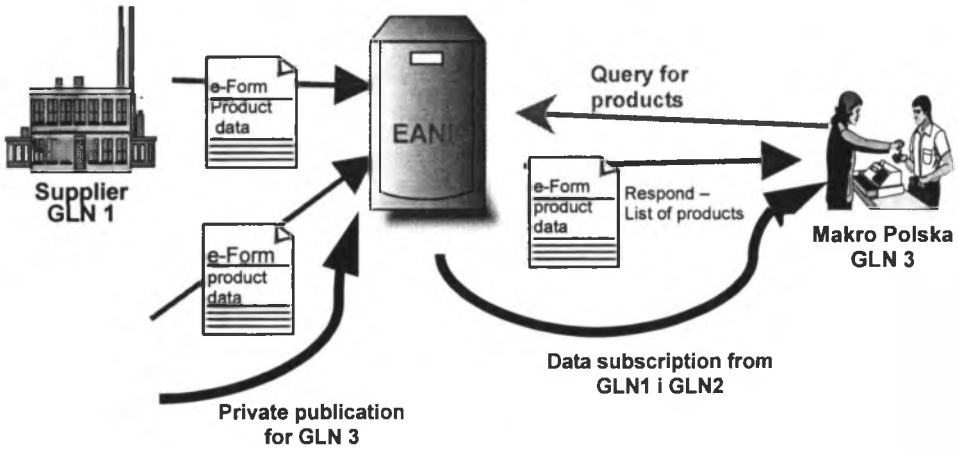

Fig.2. Master data alignment between suppliers and retailer

6. GLOBAL DATA SYNCHRONIZATION

Today, trading partners are very often located in different countries and sometimes in different continents. In addition, the globalization of trade has generated an accelerated need for a smooth inter-company flow of goods and a better control of supply chain processes. This can be achieved via synchronized communication among trading partners. GDSN is a distribution system for data suppliers (manufacturers) and customers (retailers) that enables real time attribute harmonization. Suppliers upload their data to a source data pool of their choice. This data pool sends basic information about each item to the Global Registry. The Global registry holds this information and the location of each item's data pool. Customers search the Global Registry via their chosen data pool for items or a party they want to subscribe to. The supplier and customer data pools perform the publication and subscription process. In the end, information is automatically and continuously synchronized between data pools.

The GDS model, due to global standards, a well-defined global data dictionary and standardized business messages, can support decision making very well. It is quite easy for trading partners to find up-to-date data about a product which they want to use in making a decision. Logisticians can find all the required information about product dimension, storing and distribution condition in data pools. This substantially decreases the waste of loading trucks or warehouse storage space. All in all, the right decision in the decision making process is based the right data.

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