

COMMON AND ACCEPTED ELECTRONIC DATA INTERCHANGE INTERFACE BETWEEN FINNISH ELECTRICITY SUPPLIER COMPANIES AND THEIR SERVICE PROVIDERS

Heikki LAAKSAMO

TIEKE Finnish Information Society Development Centre – Finland
heikki.laaksamo@tieke.fi

ABSTRACT

Finnish Energy Industries started in September in the year 2009 a project called "Interoperability of the information systems of Finnish electricity supplier companies and their service providers". Common recommendations were created in the project for to exchange electronically property management information and for to report work. The project was finished in the end of June in the year 2010.

The main targets of the project were to activate companies of the business branch to take electronic data interchange based on the XML standard in to the use, to accelerate development process of application software and to decrease integration costs by creating common and accepted recommendations. The recommendations also decrease needs to create company based recommendations that conflict with each other. One target is also to give companies and organizations a new and modern way to exchange information between each other. By taking the recommendations in to the use the companies can improve data interchange between each other and get it faster, improve customer service and decrease errors.

The project was organized by Finnish Energy Industries and the partners of the project were the main electricity companies and organizations in Finland and their main service and application software provides. The message application recommendations and the recommendation for electronic data interchange were produced by TIEKE Finnish Information Society Development Centre.

WHAT IS ELECTRONIC DATA INTERCHANGE

Electronic data interchange means information exchanging in electronic and standard form between parties such that the data is presented according to a generally accepted standard or convention. This means that the information to be exchanged is identified, grouped and arranged in the file according to the jointly agreed rules. Information of a particular document, such as an order or a readymade acknowledgement, is transmitted each time in the same

format. The contents of the information vary depending on the situation but the data containing certain information is always transferred in the same place of the file in a certain form named by the same way. There are also rules about how to express that some information is missing so that a system deceiving the file can handle it even if certain information is not exchanged. The file containing information of a certain business document is called a message.

A party who sends a message is called a message sender or a sender in brief. This party also picks up the data from the information systems to be sent in the message, arranges the data for the message according to the rules, prepares the exchange and sends the message using a certain file transfer protocol agreed between the sender and the receiver.

The party who receives the message from the sender is called a message recipient or a recipient in brief. After receiving the message this party has to ensure the sender is authorized to send a message. The recipient also makes different kind of inspection to be assured of the accuracy of the information and saves the information of the message in to the databases of the systems. The figure 1 represents data interchange between a sender and a recipient.

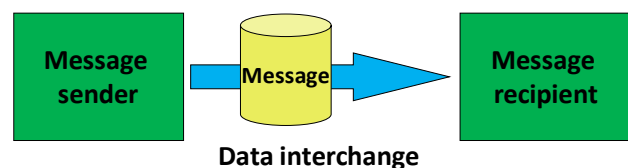


Figure 1: Data interchange between a message sender and a message recipient

The situation described above represents a situation where the sender and the recipient have the same system. In that case the file containing the information of the message is not needed to convert in a standard format. The figure 2 describes a situation where the sender and the recipient have different systems. In this case the sender has to convert the file into the standard form and the recipient has to convert the file received from the standard form to the form the system can utilize. If the sender has many partners to whom he sends the message files and also the recipient has many partners from whom he receives files the sender and the recipient very often buy converting services of operator.

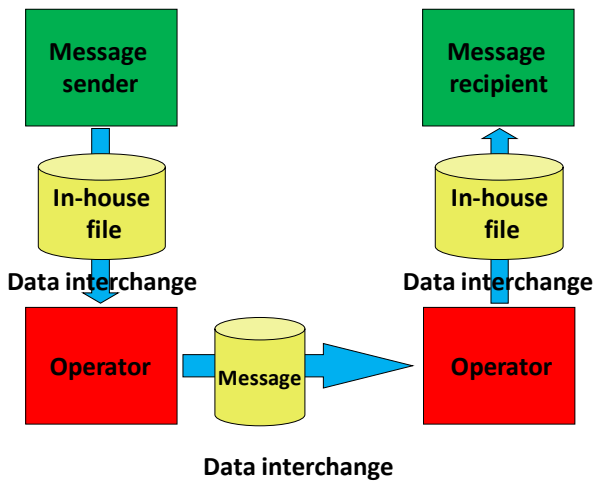


Figure 2: Data interchange between a sender and a recipient using operators

The operator receiving the in-house file from the message sender converts the file in the standard message form. The in-house file is in the form the system of the sender produces. After converting the in-house file the operator sends the message using an agreed file transfer protocol to the operator the converting services of which the message recipient uses. The receiving operator converts the message in the in-house file format so that the systems of the message recipient can handle it. The sender and the recipient can also do converting in their own system or they can have their own converting systems so that they do not need to buy any external converting services.

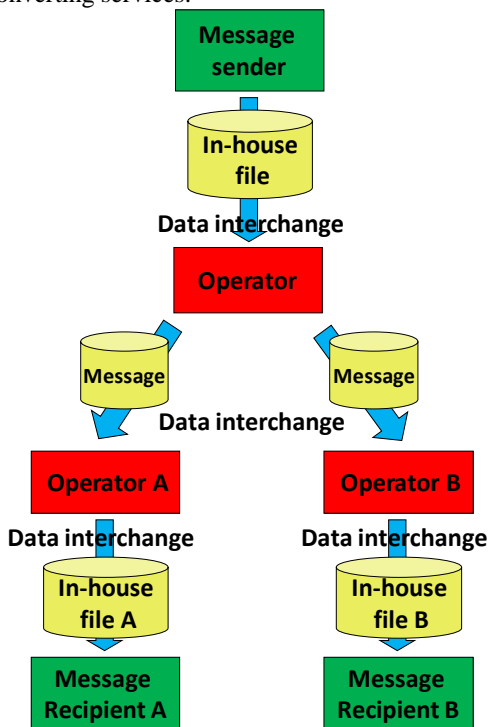


Figure 3: Data interchange between a sender and two recipients using different systems

In the figure 3 there is an example of a situation where a message sender has two partners. Both of them have their own system where they want to receive the information of the message. In addition those systems differ from each other. By using the general standard messages the sender can send the same kind of a message to both of the recipients without taking into account the differences of their systems. There can also be more recipients than two and a recipient can receive same kind of a standard message from many senders without different interfaces for all the senders.

WHY STANDARD FORM ELECTRONIC DATA INTERCHANGE IS USED

A company or an organization can get different kind of advantages while using electronic data interchange.

After building the procedures needed to pick up data and forming the in-house file or the procedures to save information of the in-house file in the databases the usage of electronic data interchange is nowadays rather cheap. Because data transmission has become faster and faster and the size of a file transmitted can be bigger and bigger electronic data interchange is also nowadays very effective. After a person has saved all the information needed in the message in the application system he can start the interchange by pressing a button on the screen or informing the system that the data is ready to be sent. The user of the application does not need to print paper documents to be sent by mail or by fax. The recipient also gets data directly into the system without manual activities. This minimizes possibilities to make errors because the data is not saved manually again and again into the systems. When the data is arrived into the system it can be used by everybody authorized to see and handle it. Paper documents often left to lie on the desk of a person who was not present that made the processing of the document slow. When the information is received directly into the application system it is easier to manage it. In addition to that information of a standard message is accurate because certain information is received in a certain part of the message. This means that the recipient of the message does not need to interpret information of a message. By getting information faster from the partner the recipient can also react faster and fulfill the wishes and needs expressed in the message faster. This means that the sender feels to receive better service. A company that uses electronic data interchange also gets a modern imago among its partners.

BACKGROUND OF THE PROJECT

There are different kinds of branch oriented application systems used by Finnish electricity supplier companies. Customer management systems, measurement systems, network information systems, support and control systems of usage of electricity as well as construction systems developed by different software suppliers utilize different kind of data models. These systems are in use in different electricity

supplier companies but not in all of their partners such as their service providers. Information of these systems is very important for construction, maintenance and other activities of asset management. This means that information exchange between partners' systems is difficult and requires a lot of integration work or usage of many information systems at the same time. The figure 4 describes the situation of data interchange in the beginning of the project when there were no jointly agreed recommendations.

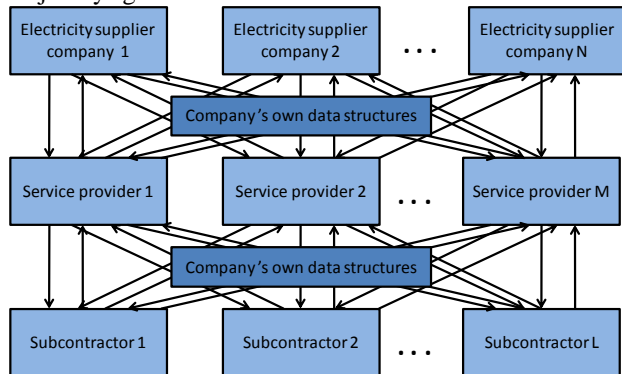


Figure 4: Data exchange between partners without jointly agreed recommendations about electronic data interchange

Because the business branch had no general recommendations transfer protocols and data structures had to be agreed again and again when a new connection was built. This required both time and financial resources. It was also costly to build and maintain that kind of solutions. General and common data format standard would make a flexible cooperation possible between partners as well as it would make possible to build new services quickly and easily without taking into account special features of a system used by a certain partner.

The purpose of this project was to establish general and common rules for data models and to create recommendations for messages used by the energy industry to facilitate the exchange of information. The figure 5 describes data exchange between partners when general and common data models and messages are used.

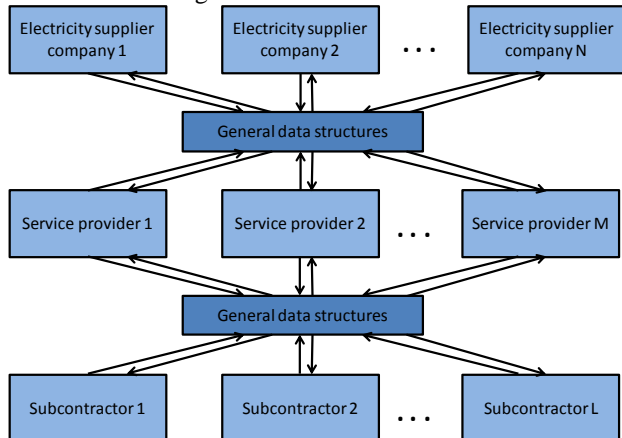


Figure 5: Data exchange between partners with jointly agreed recommendations about electronic data interchange

RESULTS OF THE PROJECT

Application recommendations were produced for 13 different main data flows of the business branch in the project. The recommendations are the following:

- resource needs,
- resource reservation,
- request for quote,
- list of needed products,
- quote,
- order for work, project or assembling an electricity gauge,
- order change,
- order cancellation,
- order response,
- work progress information,
- dispatch advice,
- general information and
- technical acknowledgement.

The figure 6 shows how the messages are related with each other in a transaction.

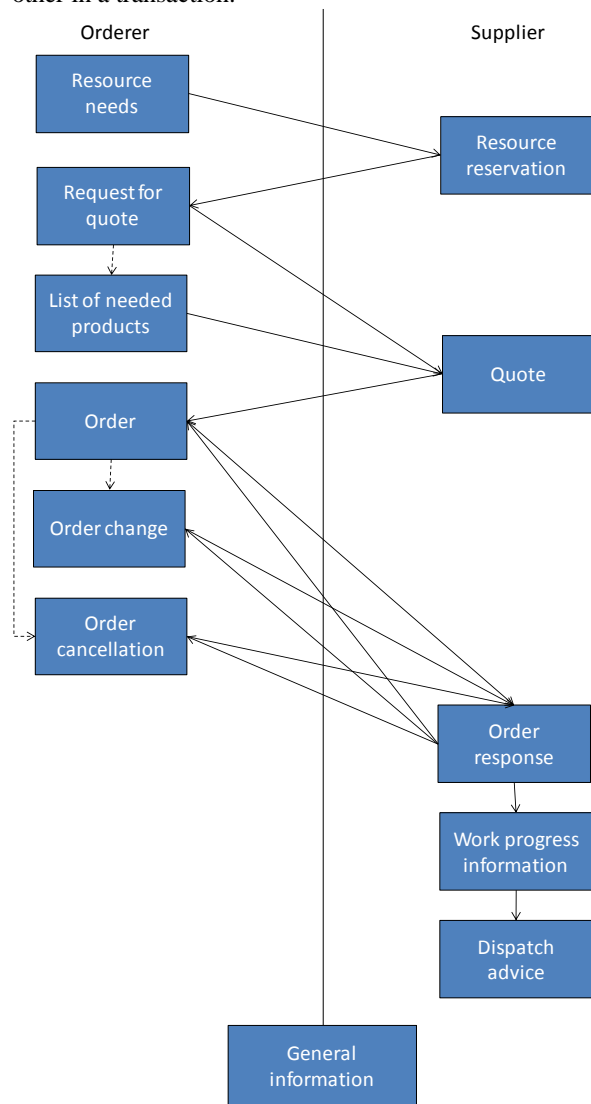


Figure 6: Relationship between the messages in a transaction

The general information message can be sent anytime new information is needed between partners in a transaction. A technical acknowledgement message can be sent every time a message is received or its data has been saved in the databases of a system.

The application recommendations base on the international standard UBL (Universal Business Language) version 2.0 that bases on the XML standard and that is developed by OASIS (Organization for the Advancement of Structured Information Standards). They advice the users how UBL messages can be applied on the business branch of the electricity industry. When the recommendations were made the results of the international project called NES (Northern European Subset) were also taken into account to increase possibilities to apply recommendations also abroad. The content of a message application recommendation is following:

- General information of the message and of its application
- The work process to which the message relates
- Data content of the message (data list)
- Structure of the message (UML class diagram)
- Definition of the message (aggregates and elements)
- Messages examples

A recommendation for electronic data interchange was also produced in the project. In the document the main vocabulary and features of the electronic data interchange were given. There was also information about the partners of the electronic data interchange and their roles and their tasks. The software applications needed in the electronic data interchange and their features and remands were also described in the document. The recommendation can be applied while making software projects on the area of the electronic data interchange or while buying software and services for electronic data interchange. The recommendation also contains information about how to make agreements for electronic data interchange between partners and checking lists for the companies developing their own software applications or buying software and services for electronic data interchange.

BENEFITS FOR THE BUSINESS BRANCH

Electronic connections built according to the message recommendation made in the project enable fast and correct data interchange between partners. Number of errors will decrease because data is saved manually only once into the systems. This will give advantages to the partners because amount of manual data processing will decrease and because amount of correcting work of data saved incorrectly into the systems will also decrease.

If a party receives 250 orders during a day it receives 50 000 order in a year. If it takes three minutes to save data of an order in a data system the manual processing takes 150 000 minutes i.e. 2500 hours i.e. 333 workdays in a year. If data is

received electronically and if it is checked automatically one can get considerable savings. An order is usually the first stage of a transaction. After that data of the other stages of the transaction will be exchanged. During those actions manual work will multiply and the risk of errors will increase if data is not received electronically into the system. If electronic data interchange is used on every stage of the transaction all the parties involved into the transaction will gain.

Common data representation standard fastens creation of new electronic connection if the data systems of the partners are able to send and to receive data according to the jointly agreed recommendations. Because the procedures of the systems to send and to receive data have to be built only once the company will gain. Also the maintenance of the common procedures is easier and cheaper than to maintenance many different procedures build specially for different partners. The data received electronically can be used immediately by all the persons authorized to work with it that will intensify business.

General data representation standards and data interchange recommendations will unify business processes of the partners. In that case the electricity supplier company feels to receive the same kind of service regardless a service provider. Service providers can also serve better and more effectively electricity supplier companies because they can receive data in the same form from different electricity supplier companies. Data interchange in the standard form also streamlines and simplifies activities between electricity supplier companies and their service providers which make service faster and better.

If electronic data interchange is used in the whole transaction an electricity supplier company has all the time actual information about a progress of a work. It is also easier to solve different kind of errors. The jointly agreed data interchange standard makes it possible to receive all the tasks in the same work queue. In that case it is easier to manage and allocate resources than if the information is exchange by many different ways. It is also easier to check the progress of the work and the work can be invoiced faster.

It is also easier to change a service provider while using the recommendations made in the project because there is no need for provider specified interfaces and because changes in the systems are not needed. This also improves competitiveness. The contract period can be started faster because there is no need for time consuming system development.

The benefits mentioned above relate to the electronic data interchange between electricity supplier companies and their service provides. The same kind of benefits can be also gotten by using the same kind of electronic data interchange between service providers and their subcontractor.