

Methodology for UN/CEFACT Standards

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Abstract

Thanks to the rapid progress and deployment of technology such as M2M and smart grids, energy infrastructure is becoming much "smarter" - that is, it is now possible to gather useful data that can be used to enhance performance and operations. The potential volume of information available seems, for all intents and purposes, to be limitless. Various methods and approaches (systems, machines, languages, etc.) are being used to collect and store information. The key to effective utilization of the accumulated data is a standard that can smooth out the differences between systems and devices, as well as between states, styles, and languages, and operate on the data in a consistent and cohesive manner. This paper introduces standards set by UN/CEFACT, the standardization organization that has been called upon to solve this issue.



UN/CEFACT, international standard, ebXML, UMM, CCTS, NDR, recycling of data

1. Introduction

The United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT) is an international standardization organization that works in cooperation with the World Trade Organization, along with the International Standardization Organization (ISO), International Electrotechnical Commission (IEC), and International Telecommunication Union (ITU). This paper discusses the standards set by UN/CEFACT and introduces ongoing energy projects (as of July 2015).

2. UN/CEFACT

Within the United Nations framework of the Economic and Social Council, the United Nations Economic Commission for Europe (UNECE) serves as the focal point for trade facilitation recommendations and electronic business standards, covering wide range of services such as supply chains, customs, financing, tourism, utilities, and administration. In this context, UN/CEFACT was established, as a subsidiary, intergovernmental body of the UNECE Committee on Trade (**Fig. 1**).

UN/CEFACT is currently in the process of developing standardization guidelines based on the ISO/IEC 14662



Fig. 1 Organization chart of the United Nations (excerpt based on CEFACT).

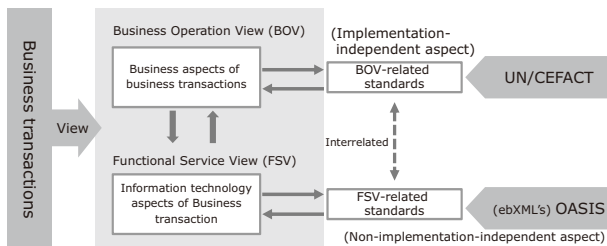


Fig. 2 ISO/IEC 14662 (inside dashed-line box).

Open-EDI Reference Model Standard. This open-EDI reference model is comprised of an implementation-independent viewpoint called the Business Operation View (BOV) and a non-implementation-independent viewpoint called the Functional Service View (FSV) (Fig. 2). By separating these aspects with different life cycles, these models are designed so that the system can be maintained longer.

In addition, as supplementary information, BOV and FSV lie beneath the application layer that corresponds to the seventh layer of the ISO/IEC 7498 Open Systems Interconnection.

2.1 Roles of BOV and FSV

Once operations such as B2B, G2B, B2C, and B2C have been determined and established, their lifecycles are often longer than other lifecycles more directly affected by technological innovation in ICT. In fact, the speed of technological innovation in the ICT field is so fast that it is often referred to as "dog years." System obsolescence is often the result of non-updated technologies in the ICT field.

Generally, if a system in the BOV can be maintained and continued while collaborating with the latest FSV as and when required, then it should be possible to delay the obsolescence of the system as a whole. This can facilitate the construction of a more economical system. At the same time, experts on either view can concentrate on their specialties, allowing them to pursue their studies in greater depth.

2.2 UN/CEFACT Features

Features of the UN/CEFACT are listed below.

- High recognition as an international standardization organization for global e-business
- Commitment to global trade extending over 40 years including EDIFACT, its predecessor
- Universal platform on a BOV level that meets requirements of various industries and various

countries

- Participation of experts from various and diverse fields and countries

In addition, the intellectual property rights of standard specifications (including technical standards) at the UN/CEFACT have all been renounced.

3. UN/CEFACT Standards

The UN/CEFACT's website (<http://www.unece.org/cefact/>) shows the various operation specifications that are exchanged with business counterparts. The site also shows technical specifications when those operation specifications are created. By using these technical specifications as a reference, it is possible to plan standard specifications that maintain a certain level of quality. This section introduces excerpts from the main technical specifications and operation specifications.

3.1 Standards of Technical Specifications

3.1.1 UMM

The UN/CEFACT Modeling Methodology (UMM) is a technical specification that stipulates the concept and notation methods for modeling operations with business counterparts in e-business. In the notation methods, restrictions are based on the unified modeling language (UML). This allows developers to perform modeling that maintains a certain level of quality. In the UMM, the minimum granularity of an exchange between business counterparts is called a "business transaction." The granularity an operation can achieve by bundling one or more business transactions is called a "business collaboration." The granularity of a bundle of multiple business collaborations is called a "business process." The concept of these granularities and methods of modeling are incorporated in the UMM to make possible universal modeling of operations in various industries.

3.1.2 CCTS

The UN/CEFACT Core Component Technical Specification (CCTS) is a technical specification to create business information that is exchanged with business counterparts in e-business. The CCTS uses ISO 11179 Metadata Registries (MDR) for reference and focuses on two factors: first, that people can understand the content of the items of the business information to be created, and second, that computers can process those items. Also the CCTS itself has become one of the ISO international standards as part 5 of ISO 15000 (eBXML).

3.1.3 NDR

Assuming XML as an intermediate format when business information is exchanged between business counterparts in e-business, the UN/CEFACT XML Naming and Design Rules Technical Specification (NDR) is a technical specification to uniquely define XML from business information. Additionally, the product created by NDR is an XML schema.

3.2 Standards of Operation Specifications

Examples of the UN/CEFACT standards include various operation specifications for supply chains, financing, procurement, utility, and tourism. We will review those specifications here. A number of specific projects in various domains are now underway. Development is being conducted according to the open development specifications of UN/CEFACT.

3.2.1 BRS

The Business Requirement Specification (BRS) is based on the UMM and details the operation (procedure) of a business transaction. There is more than one BRS in each project. By understanding the BRS, ordinary users will be able to understand the details of operations as international standards.

3.2.2 RSM

The Requirement Specification Mapping (RSM) is based on the CCTS and describes business information exchanged with business counterparts. Information is built in the unit of business transaction. By understanding the RSM, ordinary users will be able to understand the specific items when information is exchanged with their business counterparts.

3.2.3 XML Schema

The XML schema developed with the NDR is used for defining business information exchanged with business counterparts as unique XML. The XML schema is also provided with a validation function for corresponding XML documents and can verify the requirements and options of the XML structure, as well as the multiplicity of components. By using this XML schema, ordinary users will be able to simplify the construction of a system required for information exchange that corresponds to computer processing during a transaction.

Table Statistical information of CCL 2015 Version A.

CC		ABIE			
		Message-BIE		Reference-BIE	
ACC	547	ABIE	816	ABIE	1,096
ASCC	2,007	ASBIE	1,857	ASBIE	3,045
BCC	4,704	BBIE	4,289	BBIE	6,554
Total	7,258	-	6,962	-	10,695

3.2.4 CCL

The Core Component Library (CCL) is a business dictionary that collects business data created in various projects. To make it easier to recycle business information, the CCL compiles data according to classes, class components, and related classes (**Table**). Each project first refers to the CCL and confirms whether or not the project's relevant items have been registered when business data items required for the project are going to be created. If there are no relevant items, the project registers new items in the CCL after harmonization is complete and uses them. The CCL is now managed with Excel and updated twice a year (first half is noted with "A" and second half with "B").

4. Features of CCL

4.1 Business Data

UN/CEFACT business data is created in accordance with CCTS and refers to ISO 11179. This makes it possible to define information by focusing on improving recyclability, improved understandability, and improved computer processing capability. The CCTS uses two configurations to achieve these goals: the Core Component (CC), which is neutral in terms of business semantics; and the Business Information Entity (BIE), which incorporates specific business semantics (**Fig. 3**).

BIE is defined when business context is added to CC (**Fig. 4**). As the attribute values of the BIE, the business context is comprised of the following data: Business Process, Product, Industry, Region (Geopolitical), Official Constraints, Role, Supporting Role, and System Constraints. For data item notation, the BIE is defined by adding modifiers to the names of the items of the CC.

4.2 Harmonization

To register CC or BIE to CCL, the relevant business data must be submitted to the CCL maintenance group (CCLMG) of UN/CEFACT for screening. This procedure is

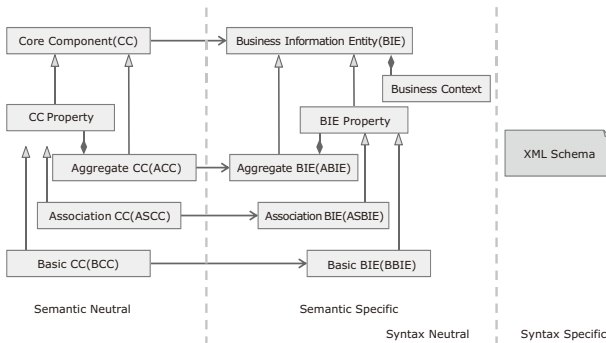


Fig. 3 Relationship between CC and BIE.

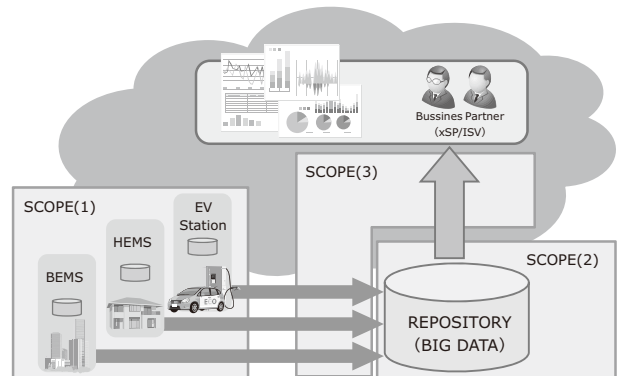


Fig. 5 Overview of RDUMS project.

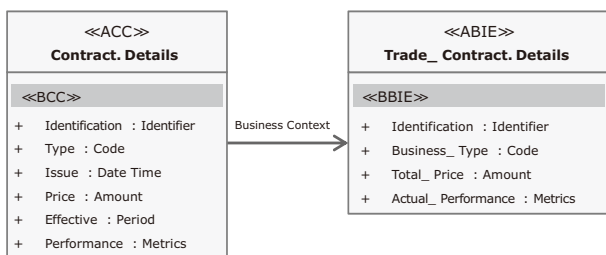


Fig. 4 Creation example of BIE from CC.

called "harmonization."

To harmonize the data, the CCLMG visually confirms the meaning (semantics) of the business data on an item-by-item basis to check if a CC or BIE with the same meaning is already registered in the CCL. If the relevant business data already exists in the CCL, the submitted data will be reconstructed using the existing CCL or BIE. If no matching business data exists in the CCL, the new data will be added to the CCL. In that case, the designation rule and construction need to be in line with the syntax specified by the CCST.

There two ways to make a submission to the CCL. One is when the relevant business data is created in a project inside UN/CEFACT, the other is when the data is created by a standardization organization other than UN/CEFACT (a forum-style standardization or a regional standardization organization). Should that be the case, the syntax needs to comply with the CCTS. The former is registered in the CCL as Message-BIE and the latter is registered as Reference-BIE.

5. RDUMS Project

The Reutilization of Data from Utility Management Systems (RDUMS) project falls under the purview of the industry-specialized project development area/utility domain. An overview of the project is given below.

5.1 Scope of the Project

The scope of the RDUMS project covers (1) to (3) as shown in Fig. 5.

- Definition of business requirement specifications in order to store business data used in various utility management systems (including BEMS and HEMS) in cloud-based storage systems (Fig. 5-(1)).
- Clarification of business requirements in order to establish common methods to streamline and simplify the recycling of data stored in cloud-based systems. This applies not only to utility markets such as energy, but other markets as well (Fig. 5-(2), (3)).

5.2 Use Case Example

Utilization of inter-industry utility data is being considered as a use case for this project.

In this case, the project serves as a hub (including Big Data functions) that distributes business data created by various industry-specific systems via the core component dictionary of UN/CEFACT. Since the data was

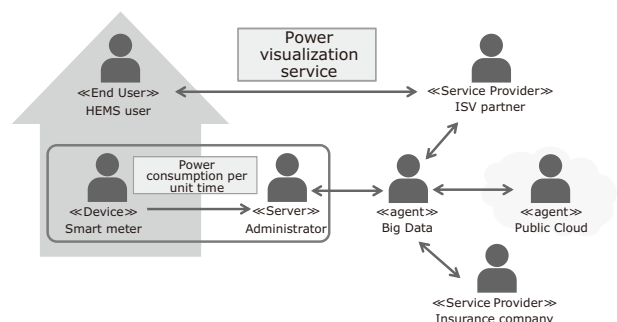


Fig. 6 Use case of RDUMS project.

originally gathered in various industry-specific systems, inter-system collaboration on the data axis is difficult. However, it is considered possible to achieve pseudo-collaboration of systems because the meaning and syntax of the data can be captured uniformly via the CCL.

If this is accomplished, new services that transcend the barriers of conventional fields can be offered by insurance companies, for example (**Fig. 6**). This will make possible collaboration with industries not previously involved.

6. Conclusion

In the above, we have introduced UN/CEFACT's standard specifications and RDUMS project. The term IoT (Internet of things) is becoming more popular as an ever-widening range of data is collected and analyzed in the cloud. However, sharing this data is not easy. Standardizing data according to the UN/CEFACT specifications will allow it to be utilized in various domains and achieve inter-industry collaboration.

Reference

- 1) ccts:
http://www.unece.org/cefact/codesfortrade/ccts_index.html
- 2) umm:
http://www.unece.org/cefact/umm/umm_index.html
- 3) ndr:
http://www.unece.org/cefact/xml/xml_index.html
- 4) ccl:
http://www.unece.org/cefact/codesfortrade/uncccl/ccl_index.html

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The details about this paper can be seen at the following.

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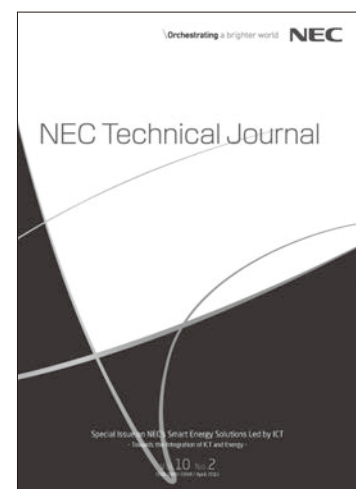
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Vol.10 No.2
April 2016

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