

AnnexIV-2: Thai Data Harmonization Case

AIV2-1.Overview of data harmonization initiatives in Thailand

Traders have to deal with various concerned parties and process a lot of related documents for achieving the procedural and documentary requirements involved in import and export processes. They face many complexities. Thailand has, therefore, established the National Single Window (NSW) initiative as a strategy to enhance the import and export procedures. To improve the efficiency in documentary procedures required to expedite the movement of goods in and out of the country, the National Single Window facilities have been developed to enable services where information is submitted electronically and used many times among different ICT platforms of organizations. Thailand's National Single Window aims to support a single entry of identical data; a single synchronous processing of data; decision-making for clearance and release of cargoes at a single point; and a compilation of statistics for economic analysis and management¹. As a result, redundant procedures and unnecessary documentary requirements are eliminated and the sharing of trade and transport data among relevant stakeholders is promoted. In moving toward that ultimate goal, data harmonization is taken as the key component among others to achieve the establishment of NSW. Figure AIV2-1 below reflects the rationale for implementing the data harmonization project in Thailand. Exporters need to deal with 35 government agencies (2-5 agencies for each shipment) and eight business parties (exporter, importer, bank, insurance company, freight forwarder, carrier, terminal operator, warehouse or stuffing area) to fulfill regulatory and documentary requirements for the export process. Each import or export requires exporters to fill in from 500 to 700 data fields for 25-40 documents. Among those data entries, 60 to 70 per cent of them are filled in more than once.

Needs and Requirements of Data Harmonization Project
A Case of Thailand

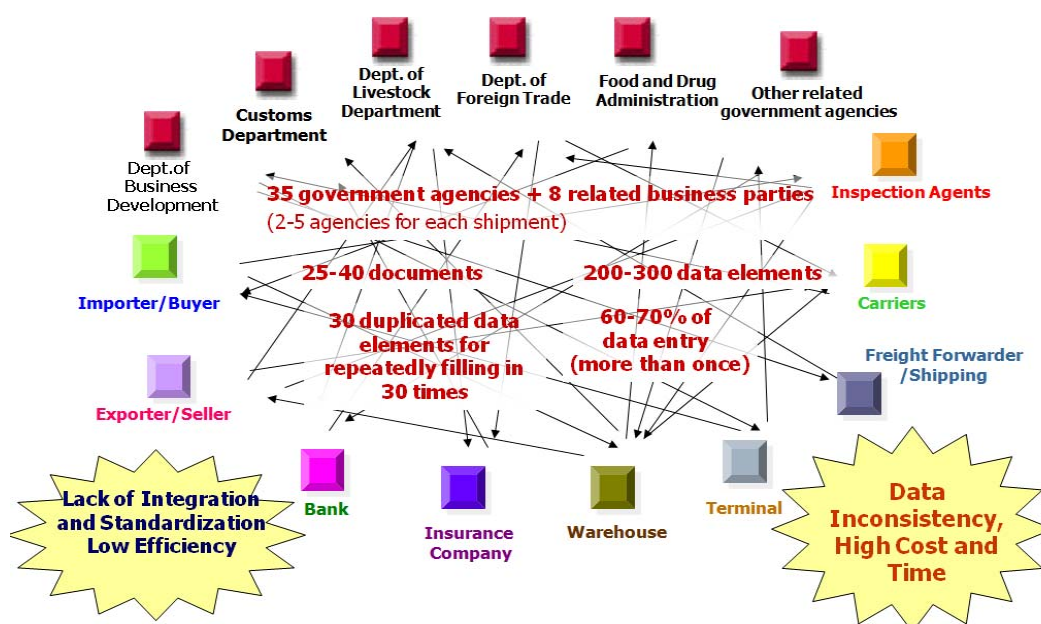


Figure AIV2-1: Needs and Requirements of Data Harmonization Project in Thailand

Figure AIV2-2 shows that document simplification and data harmonization is one of the essential components to realize the Single Window facility.

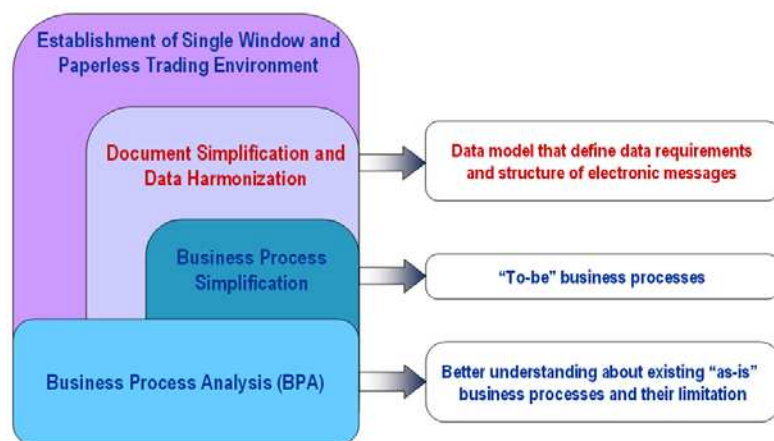


Figure AIV2-2: Essential Steps for Establishment of the Single Window Facility

The data harmonization efforts contributing to the development of Thailand’s NSW have been carried out in three phases starting from the project related to transport and e-logistics implemented by the Ministry of Transport in 2007. Next the projects sponsored by the Ministry of Information and Communication Technology to implement the data harmonization and standardized data set associated with the issuance of permit, license, and certificate were carried out by 21 government agencies in 2008. Finally the data harmonization and standardized data set used in the business processes of other government agencies and trade community including banks and insurance were carried out in 2009. The scope of data harmonization in each phase is outlined in Table AIV2-1.

<p>Transport Single Window e-Logistics for supporting National Single Window (2007-2008)</p>	<p>Project Sponsor: Ministry of Transport Scope: Transport-related data requirements from 59 regulatory documents related to different modes of import/export-related transportation. Output: The total number of 1,378 data elements has been reduced to 213 data elements.</p>
<p>Data Harmonization and Standardized Data Set in Thailand, Part 1 (2008-2009)</p>	<p>Project Sponsor: Ministry of Information and Communication Technology (MICT) Scope: Data requirements from 189 documents used in business processes associated with the issuance of permit, license, and certificate carried out by 21 government agencies. Output: The total number of 6,765 data elements has been reduced to 259 data elements.</p>
<p>Data Harmonization and Standardized Data Set in Thailand, Part 2 (2009-2010)</p>	<p>Project Sponsor: MICT Scope: Data requirements from 129 documents used in business processes of other government agencies and trade community including bank and insurance Output: The total number of 3,077 data elements has been reduced to 137 data elements.</p>

Table AIV2-1: Data Harmonization Phases in Thailand

The harmonization of data requirements in Thailand was conducted at the time where only a few standards providing generic semantic rules and serving as a building block for aligning the definitions, representation, as well as the cardinality and location in the electronic message of each data element were available. A selected approach of Buy-Ship-Pay UN/CEFACT Business Subset for International Trade, which is previously known as the UNeDocs project, for data harmonization in Thailand was generic yet sufficiently contextualized to cover the documentary requirements of all stakeholders in the international supply chain. The harmonization of data was also based on dictionary entry names from UN/CEFACT Core Component Library (CCL) and complied with UN/CEFACT Core Component Technical Specification (CCTS: ISO 15000- 5/ebXML). However, since the UNeDocs project of the UN/CEFACT working party has been suspended by the UN/CEFACT Bureau, the Data Harmonization and Standardized Data Set Project in Thailand (Part 2, 2009-2010) was based on the CCL. Also the Royal Thai Customs has planned the harmonization of those data requirements using the WCO Data Model version 3.0, which complies with the CCL, as a reference.

The Figure AIV2-3 shows the example of Thailand’s standardized data set implemented through the document called “Certification of Origin” from the Department of Foreign Trade.

Example – Thailand’s Standardized Data Set (TH-SDS)

Data Element Name	Definition (En)	Definition (Th)	ASBIE	BBIE	Format	Certificate of Origin (Form D) (กรมการค้าต่างประเทศ)
ที่อยู่รับสินค้า (Address of Consignee)	[TDED 3148] To identify a communication address.	หมายเลขโทรศัพท์ของรับสินค้า หรือ ผู้ซื้อ	Cross-Border_Consignment; Consignee; Referenced Party		1	Consignee's address
ประเทศต้นกำเนิดสินค้า (Country of origin)	TDED[3207] Identification of the name of the country or other geographical entity as specified in ISO 3166 and UN/ECE Rec 3 TDED[3206] Name of the country or other geographical entity as specified in ISO 3166 and UN/ECE Rec 3	ประเทศต้นกำเนิดสินค้า		country name	an..3 an..35	Issued in (country) produce in country (exporting country)
หมายเลขขนส่ง (Transport No.)	[TDED 8028] The unique identifier of a journey of a means of transport, for example, voyage number, flight number, trip number	หมายเลขพาหนะขนส่ง	UNeDocs Ship BIM; Transport Contract; Cross-Border_Consignment; Cross-Border_Consignment; Main Carriage; Cross-Border_Transport Movement	Cross-border_Transport Movement; Identification; Identifier	an..17	voy no./flight no.
วิธีการขนส่ง (Mode of Transport)	[TDED 8067] The code specifying a mode, such as by air, sea, rail, road or inland waterway, for this cross-border transport movement.	วิธีการขนส่ง เช่น ทางเรือ อากาศ เป็นต้น	UNeDocs Ship BIM; Transport Contract; Cross-Border_Consignment; Cross-Border_Consignment; Main Carriage; Cross-Border_Transport Movement	Cross-Border_Transport Movement; Mode; Code	an..3	Mean of transport

Format	Description
an	alphabetic characters
n	Numeric
de	decimal
3	Length
..17	Variable Length

Figure AIV2-3: Implementation of Thailand’s Standardized Data Set

The collaborative effort of Royal Thai Customs, Ministry of Information and Communication Technology, other government agencies and business stakeholders in simplifying procedural and documentary requirements as well as automating all import/export-related processes as part of the National Single Window initiative since 2004 yielded remarkable outcomes. For example, through applying IT for Paperless Customs and NSW during the year of 2007-2010, the export transaction cost reduces from

848 to 625 USD which is around 220 USD per container². This savings amount of 220 USD multiplied by 3.5 million TEU per year equals a 770 Million USD transaction cost reduction per year. Table AIV2-2 summarizes Thailand's achievement in its attempt to increase efficiency in the facilitation of cross-border trade to date through the harmonization of trade data and documents.

Year	Rank	Export			Import		
		Document*	Time**	Cost***	Document*	Time**	Cost***
2007	103	9	24	848	12	22	1,042
2010	12	4	14	625	3	13	795

*Number of official documents involved in exporting (and importing) a standardized shipment of goods

**Number of days needed starting from the final contractual agreement between the two parties, and ending with ship departure from port

***USD per Container

Table AIV2-2: Thailand in Trading across Border
(World Bank, Doing Business Report 2007 and 2010)

AIV2-2.Example: Planning the Data Harmonization and Data Modeling for Single Window e-Logistics Project³

In conducting the Data Harmonization and Data Modeling for the Single Window e-Logistics Project in 2008 with the given project timeframe of 10 months, the detailed work plan was first developed. The project scope was planned to cover the data requirements from all documents used in business processes associated with the issuance of permit, license, and certificate carried out by some government agencies. The expected outputs were identified and the work components necessary to achieve them were broken down into tasks using the work breakdown structure. In addition, the number of team members and other resources needed to carry out the tasks were estimated and identified.

1) Identifying tasks of the Data Harmonization and Data Modeling for Single Window e-Logistics Project

As mentioned in Chapter 3 of the Guide, the work breakdown structure is basically an output-oriented description of the project tasks and it typically starts with outputs followed by breaking down the work components of outputs into tasks. Therefore, in order to identify tasks of the Data Harmonization and Data Modeling for the Single Window e-Logistics Project, the project outputs were first identified. The followings are the expected deliverables upon the project completion:

- National Standardized Data Set of the logistics documents used in the import and export processes
- Dictionary Entry Name (TH-TDED) for electronic documents
- Data Models of electronic documents for e-logistics
- XML Schema for the logistics documents used in the import and export processes (ready for interoperability across different platforms)

Then the works were broken down into five main work components and the project tasks required to achieve each work component for the above-mentioned outputs were defined.

Table AIV2-3 below shows the work components, specific tasks and project outputs.

² Trading Across Border, World Bank, Doing Business Report 2007 and 2010

³ Data Harmonization and Data Modeling for Single Window e-Logistics Project (2008) commissioned by Ministry of Information and Communication Technology, and researched by Institute for Information Technology Innovation, Kasetsart University, Thailand.

Work Components	Tasks	Outputs
1. Survey on trade transaction process for collection and analysis of forms that importers, exporters, and stakeholders use in the import and export processes of goods across borders	1.1 Conduct survey on trade transaction process and collect both paper and electronic forms that importers, exporters, or representatives use in the trade processes for import and export of goods across borders and then analyse the procedures of import and export, logistics, the relationship between documents used by various agencies, and data elements used in those forms. The study is scoped for at least 10 products, 26 government agencies, 6 business sectors, and 40 forms related to import, export and logistics.	List of data elements, their definitions and codes
	1.2 Collect data elements and their meanings from all the forms used in the processes of import, export and logistics and list them in a comparative manner onto the spreadsheet that shows names, definitions and code of each data elements	
2. Data analysis, simplification, harmonization, and standardization	2.1 Simplify and harmonize core data elements used in the import, export, and logistic processes based on international standards such as WCO Data Set and UNTDED to standardize the national data set	National Standardized Data Set
	2.2 Create National Standardized Data Set for data interoperability among Government agencies, transport and logistics sectors for import and export	
3. Establishment of naming and design rules to standardize XML Schemas for Logistics-related e-Documents in Thailand	3.1 Create rules in compliance with UN/CEFACT XML Naming and Design Rules; XML standard; and XML Schema of World Wide Web Consortium (W3C)	Thailand XML Naming and Design Rules
	3.2 Define code lists for data elements in compliance with UN/CEFACT XML Naming and Design Rules, and UN/CEFACT Code lists	
4. Creation of data models and XML Schema as a standard for data interoperability among Government agencies; transport and logistics sector; banking and insurance sector to facilitate import, export and logistic processes	4.1 Create data models and XML Schema to standardize at least 40 electronic documents used in the import and export processes so that the data could be interoperated among Government agencies, transport and logistic sector; bank and insurance sector to facilitate import, export and logistic processes	Data Model; XML Schema
	4.2 Produce a user guide explaining the usage and example of electronic documents	
5. Publicizing and providing knowledge of data harmonization and data modeling for concerned parties and stakeholders	5.1 Organize a seminar on National Standardized Data Set and Data Modeling for Single Window e-Logistics	Public awareness and knowledge on data harmonization and data modeling
	5.2 Organize a seminar on ICT Competency Development for Data Harmonization	
	5.3 Organize training on how to conduct Data Harmonization	
	5.4 Create a web site and publish the outputs of the data harmonization project and relevant information related to standards development and adoption	

Table AIV2-3: Identifying Work Components, Specific Tasks and Project Outputs in a Work Breakdown Structure

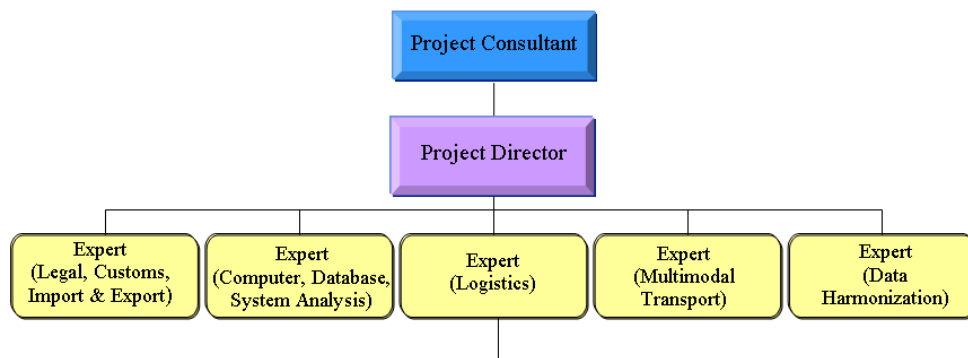
2) Preparing the Project Management Team and Team Members and Designating Tasks

In preparing the management and team for the project, it is necessary to consider the qualifications of each member suitable for the roles and responsibilities in the project. For the Data Harmonization and Data Modeling for the Single Window e-Logistics Project, the team members should possess qualifications such as:

- Have experience and involvement in import and export processes and/or
- Have expertise in documentation and understanding of data elements used in import and export documents and/or
- Have experience in IT system development that serves the import and export procedures of an organization
- Have experience and involvement in or have good understanding of the relevant rules and regulations of an organization

The project director then assigns the project tasks to the team members according to their expertise, capabilities, background knowledge and experiences. The “teamwork” should be prepared also for the responsibility of explaining why and how the electronic document needs to be used as well as to get active involvement of all concerned parties for their review and opinions on data harmonization and data model.

The management team educates and facilitates understanding among team members to ensure efficient collaboration and coordination. Figure AIV2-4 shows the structure of management team and team members of the Data Harmonization and Data Modeling for Single Window e-Logistics Project.



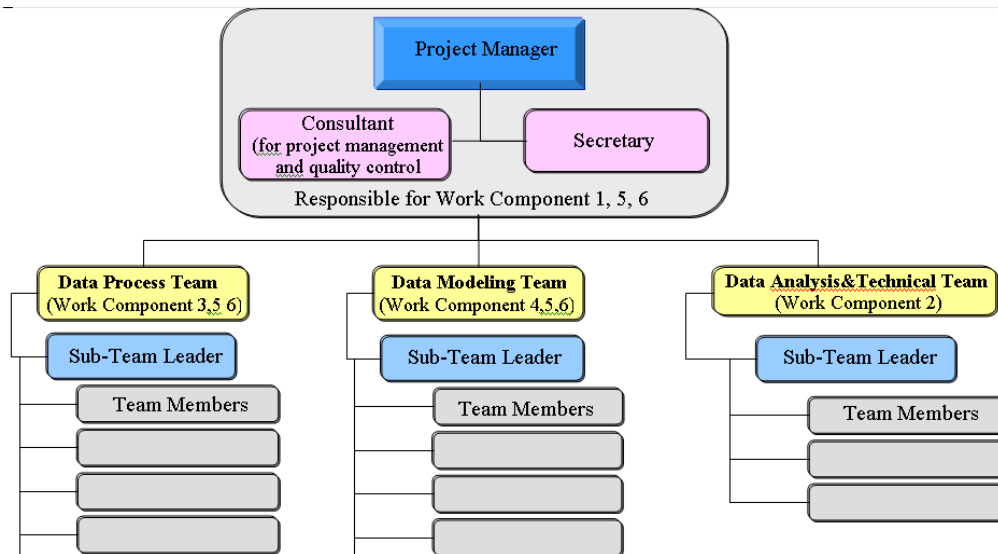


Figure AIV2-4: A Structure of Project Management Team and Team Members of the Data Harmonization and Data Modeling for Single Window e-Logistics Project

3) Develop the Project Plan and Schedule

The Data Harmonization and Data Modeling for Single Window e-Logistics Project was given a ten month (December 2007-September 2008) timeframe for implementation. The project plan and schedule were designed and developed based on the work components and tasks mentioned in 8.2.1. Each work component was specifically scheduled and the dates to deliver some certain outputs were defined in the project schedule. Figure AIV2-5 illustrates the Project Plan and Schedule of the Data Harmonization and Data Modeling for Single Window e-Logistics Project.

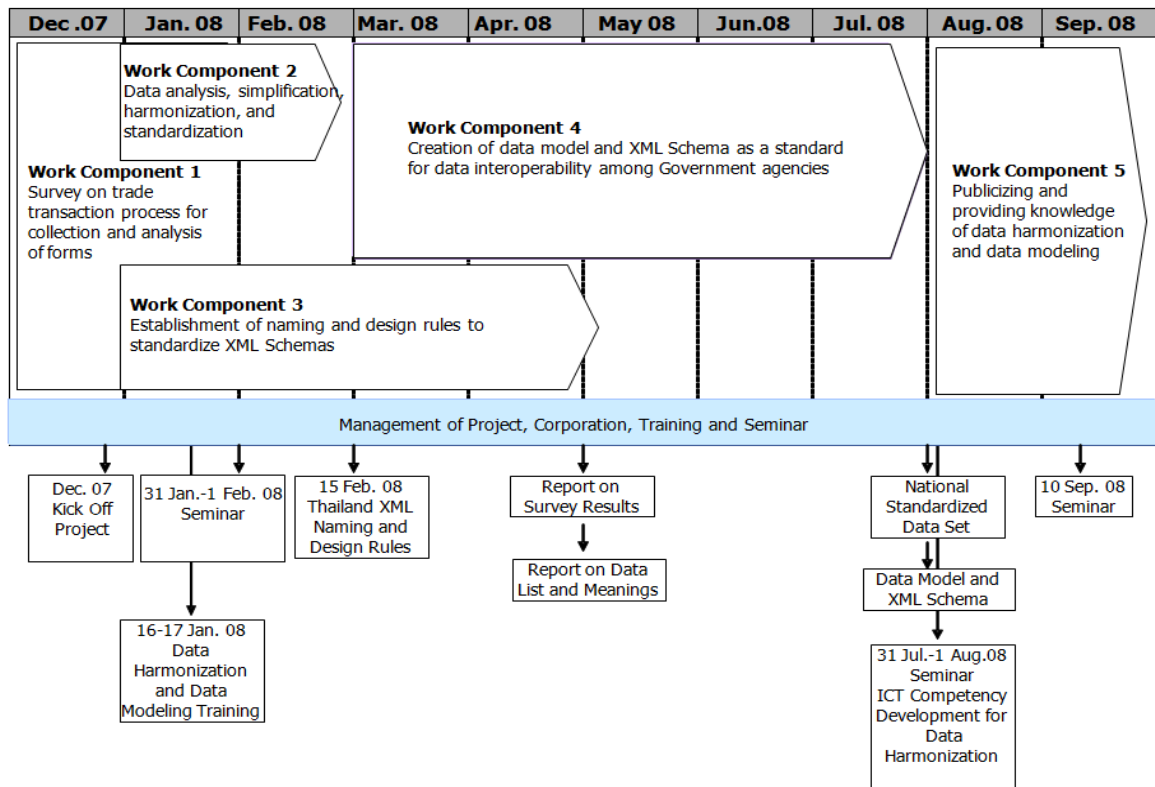


Figure AIV2-5: Project Plan and Schedule of the Data Harmonization and Data Modeling for Single Window e-Logistics Project

Based on that project plan and schedule, project status was tracked and reported on periodically as shown in Figure AIV2-6, as an example

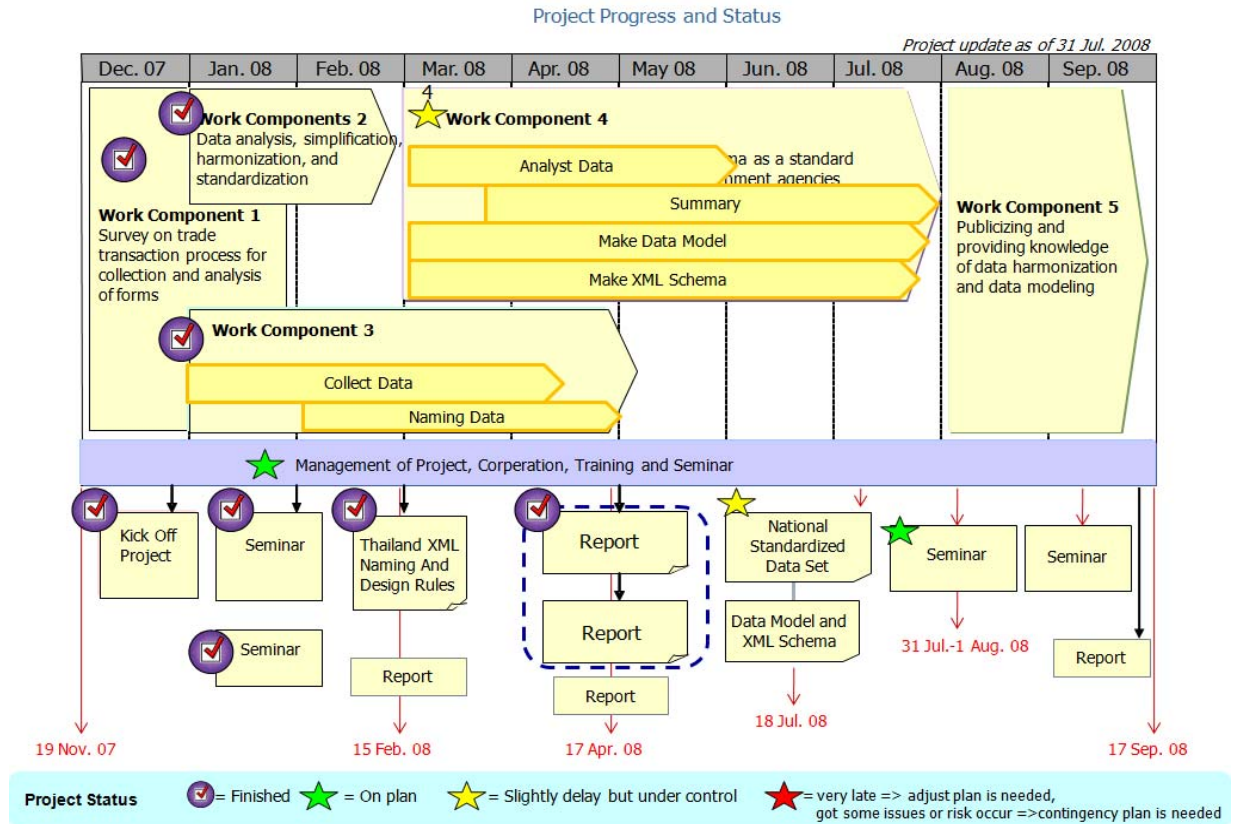


Figure AIV2-6: Progress and Status Report of the Data Harmonization and Data Modeling for Single Window e-Logistics Project Based on the Project Plan and Schedule

AIV2-3.Example: The harmonization of data elements used in the issuance of permit/license/certificate associated with the exportation of jasmine rice

1) Background

Jasmine rice is the top export product of Thailand. It generates an annual income of approximately 2,500-3,125 million US dollars for the country. The export quantity of jasmine rice is always increasing. During the year of 2002-2006, export quantity was about 7.3 million tons with the total value of around 2,057 million US dollars while during the years of 2007-2009, the export quantity has risen to 8.5-9.5 million tons with the estimated value of 2,600-2,850 million US dollars. It has taken a world market share of 30-34 per cent during the past few years⁴.

In fulfilling procedural and documentary requirements involved in exporting Thai jasmine rice, an exporter indirectly or directly deals with 15 parties. The number of parties that an

⁴ *Thai's Rice Master Strategies 2550-2554*, Rice Department, Ministry of Agriculture and Cooperatives, and *Significant Situations of Agricultural Products and Trend in 2010 (2009)*, Office of Agricultural Economics

exporter has to deal with goes up to 17 if an importer indicates a request for Certificate of Fruit, Food, Vegetable Quarantine and a legalization of trade documents. These parties are 1) exporter or representative, 2) importer, 3) exporter's bank, 4) importer's bank, 5) insurance company, 6) authorized private inspector, 7) inland haulage, 8) carrier (shipping line), 9) Port Authority and/or terminal operator, 10) Office of Commodity Standards, 11) Department of Foreign Trade, 12) Department of Agriculture, 13) Board of Trade of Thailand, 14) Customs, 15) Thai Chamber of Commerce, 16) Department of Disease Control, and 17) Department of Consular Affairs. 36 documents are needed to fill in data for regulatory compliance. There are 928 data elements in total and 362 without duplicates. These numbers are inclusive of 42 optional data elements that the Customs Department would like to collect but they are not mandatory. The number of days required for export process of jasmine rice is 14 days.

Documents related to Exportation of Rice (from purchase order until the cargo container leaving the sea port)	
1. Proforma Invoice (35)	21. Master Sea Cargo Manifest(17)
2. Purchase Order (39)	22. House Sea Cargo Manifest (37)
3. Commercial Invoice (50)	23. Export Declaration (75,39)
4. Application for Letter of Credit (24)	24. Good Transition Control List (22,3)
5. Letter of Credit (32)	25. Application for Permission to Export Rice (KP. 2)
6. Packing List (25)	26. Sales Report (KP 3) (21)
7. Cargo Insurance Application Form (20)	27. Application for the Collection of the Permit for the Export of Rice (A. 3)
8. Cover Note (23)	28. Permit for the Export of Rice (A. 4) (32)
9. Insurance Policy (24)	29. Application for Certificate of Standards of Product (MS. 13/1) (44)
10. Booking Request Form – Border Crossing (24)	30. Certificate of Analysis (17)
11. Booking Confirmation – Border Crossing (31)	31. Certificate of Product Standards (MS. 24/1) (45)
12. Booking Request Form – Inland Transport (16)	32. Certificate of Fumigation (21)
13. Booking Confirmation – Inland Transport (18)	33. Application for Phytosanitary Certificate (PQ. 7) (29)
14. Bill of Lading (40)	34. Phytosanitary Certificate (34)
15. Empty Container Movement Request (TKT 305) (19)	35. Application for Certificate of Origin
16. Request for Port Entry (TKT 308.2) (27)	36. Certificate of Origin (38)
17. Equipment Interchange Report (EIR) (24)	
18. Container Loading List (18)	
19. Container List Message (32)	
20. Outward Container List (34)	

* Number in parenthesis is the no. of data elements

Figure AIV2-7: Documents related to Exportation of Jasmine Rice of Thailand

Upon realizing that the procedural and documentary requirements are complicated and that data redundancy and inconsistency consequently result in high cost and time, the standardization and harmonization of data for export of jasmine rice is implemented. The goals are:

- discovery of redundancy in data requirements and core data elements,
- removal of duplicated data requirements, and
- simplification of data collection in a border control process.

2) Preparing the harmonization of data elements used in the issuance of permit/license/certificate associated with the exportation of jasmine rice

In order to obtain a permit for the exportation of jasmine rice, an exporter or representative has to prepare documents required for an application for regulatory permission to export rice. Those documents include:

- Application for Permission to Export Rice (KP. 2)
- Application for the Collection of the Permit for the Export of Rice (A. 3)
- Draft Permit for the Export of Rice (A. 4)
- Sales Report (KP 3)
- Evidence of Sales (Purchase Order or Sales Contract)

If an exporter or representative intends to submit the information in those documents through an online form provided by the Department of Foreign Trade, the information for the Application for Permission to Export Rice (KP.2) and the Application for the Collection of the Permit for the Export of Rice (A.3) are not required. An officer at the Department of Foreign Trade then reviews and verifies the submitted information. If it is correct, an authorized officer signs and authenticates a Permit for the Export of Rice (A.4). The exporter can receive the Permit for the Export of Rice within six working hours after the application is submitted. For example, if the application is submitted at 9.00 hrs, the Permit should be ready for a pick-up by 16.00 hrs. Figures AIV2-8 and AIV2-9 show the exporter's preparation of documents to obtain an export permit for jasmine rice and example of procedural and documentary redundancies.

Thailand's Export Process of Jasmine Rice

- ❑ Review each activity diagram, its accompanied process description, and relevant forms and documents
- ❑ Look for redundancies and non-value-added activities in procedural and documentary requirements

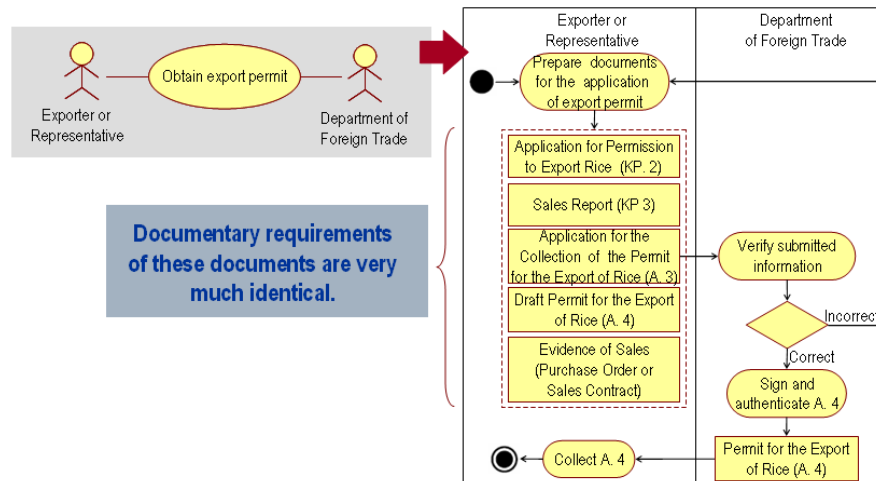


Figure AIV2-8: Preparation of Documents for Jasmine Rice Export

Identify Bottlenecks and Redundancies

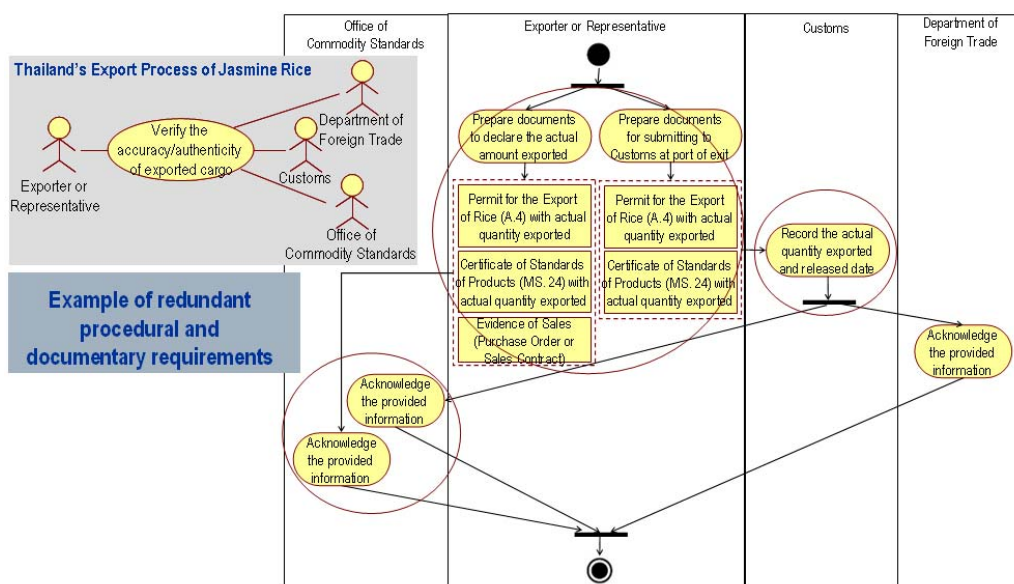


Figure AIV2-9: Example of Identifying Redundancies

In addition, an exporter or representative has to prepare the documents necessary for applying for the Certificates used in import formalities. A Certificate of Origin and Phytosanitary Certificate are often required for an importation of jasmine rice. The request for a Certificate of Origin from the Thai Chamber of Commerce can be done electronically. An exporter or representative who has already been a registered user of the system can enter the information shown in the Certificate of Origin in the provided online form. Supplementary documents including a Commercial Invoice, a certified-true-copy Bill of Lading, a Letter of Credit, and a Certificate of Standard of Products (MS. 24/1) have to be uploaded as attached files prior to the submission.

Upon receipt of the application, an officer at the Thai Chamber of Commerce verifies the information. If the provided information needs to be corrected, an officer at the Thai Chamber of Commerce will return the Certificate of Origin to the exporter or representative. This activity may take from one hour up to a few days depending on the work at hand. For an exporter or representative who has already purchased the Certificate of Origin form, the Certificate can be printed at his/her premise. Otherwise, it can be obtained at a service center of the Thai Chamber of Commerce.

If the submission of the application for the Certificate of Origin is to be done using an original process, an exporter or representative has to complete the information shown in the Certificate of Origin twice, i.e., one for the Application for Certificate of Origin and another for the Certificate of Origin itself.

The Certificate of Origin can be received within six working hours after the application is submitted. For example, if the application is submitted at 9.00 hrs., the Certificate should be ready for a pick-up by 16.00 hrs. The activity diagram in Figure AIV2-10 shows the procedure of preparing documents required by an importer.

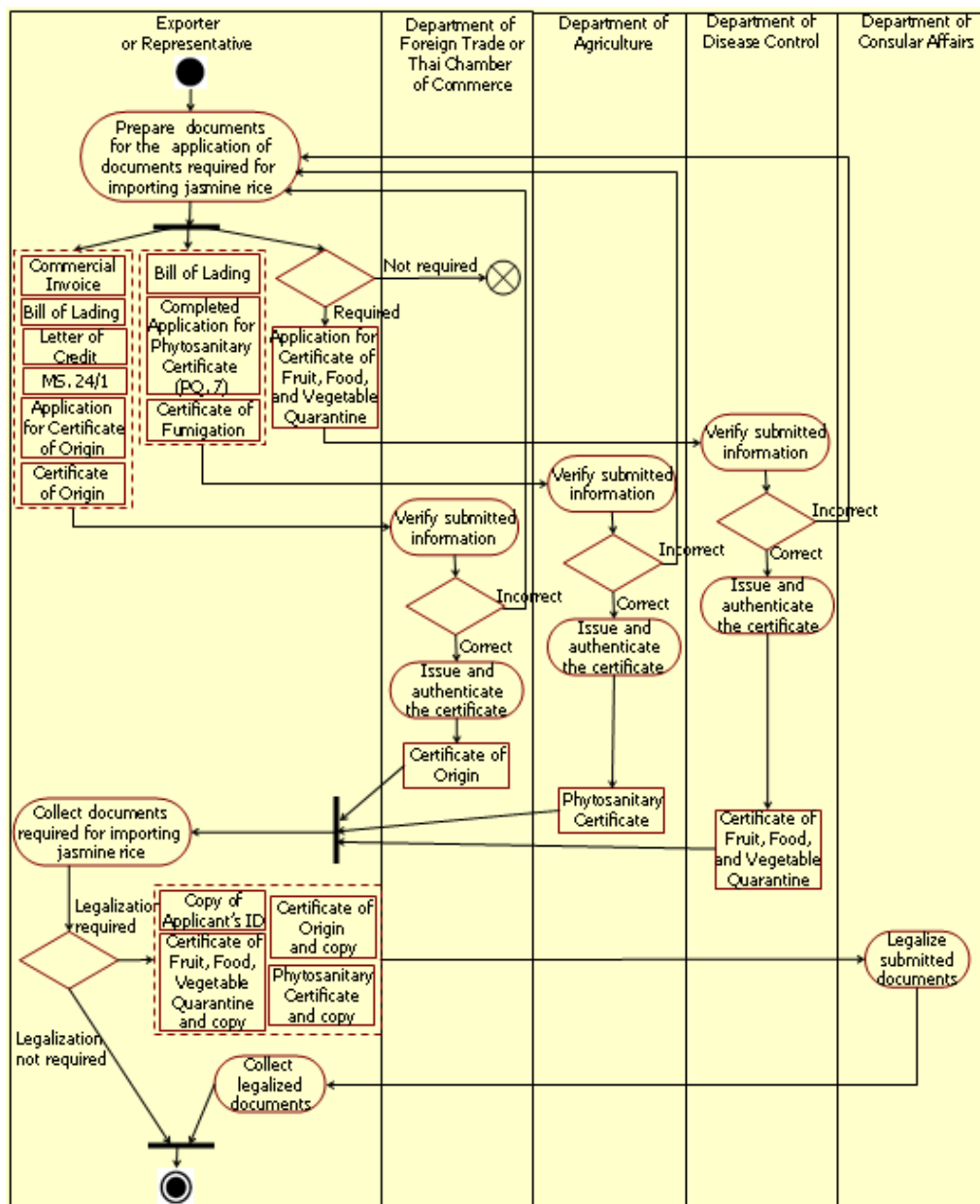


Figure AIV2-10: Activity Diagram of “Ship – Prepare Documents Required by Importer”

To implement the harmonization of data elements used in the issuance of those necessary permits and certificates associated with the exportation of jasmine rice, the following work processes are necessary:

1. Collect and make a list of documents, data element names, forms, and requests related to the exportation of jasmine rice, logistics processes for customs declaration, and any financial transaction.
2. Establish the definitions and naming of data elements correctly in correspondence with the purpose of each document and the meaning of each data element
3. Analyse data elements to reduce repetitive or redundant ones; for example, data elements with different names but having the same meaning or same purposes of use, as well as the unnecessary ones, should be removed.
4. Create data structures based on proper or intended data modeling and data dictionary by using the recognized standards or principles such as the Core Component Technical Specification (CCTS), the Trade Data Element Directory (TD ED), a Business Information Entity (BIE), Naming and Design Rules (NDR), or other suitable standard.

- Where XML is employed as the message syntax, the data model guide shall be transformed to XML schema according to UN/CEFACT XML Naming and Design Rules

3) Step-by-step approach in harmonizing data elements used in the issuance of permit/license/certificate associated with the exportation of jasmine rice

The modeling of data requirements using the same data building blocks increases the ability of different information systems to identically interpret the exchanged data and automatically process them. Data modeling is therefore an act of harmonizing data element names and the structure of documents used by different parties involved in a network of document exchange with a reference data model.

To harmonize data element names and document structure, a document-centric approach is used. The following steps are recommended:

- Step 1: Capture** business processes to identify the documents in the information flow
- Step 2: Define** each data element extracted from each document in terms of definition, data type, data format, and data constraints
- Step 3: Analyse** data elements across various documents and organize them in a comparable manner (when working with multiple documents)
- Step 4: Reconcile or Map** core data elements to a reference data model
- Step 5:** Obtain the structure of the **electronic document** in XML format

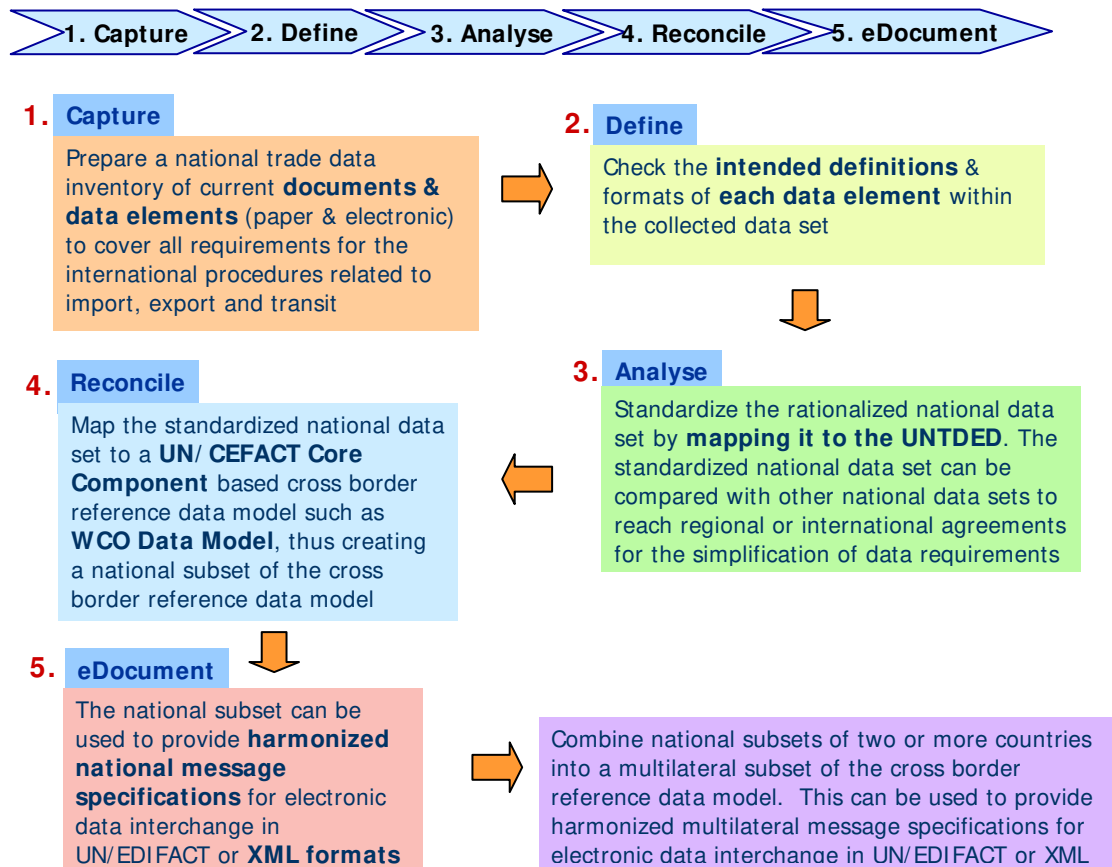


Figure AIV2-11: Step-by-Step Data Harmonization Approach – Experience of Thai Case

Step 1: Capture business processes to identify documents in the information flow

Before modeling data requirements for trade, transport, and administrative documents, it is necessary to understand the business context and the transactional environment in which each document is used and exchanged. The output of the business process analysis

enables the data modeler to specify the list of documents to be modeled. It is highly recommended to develop a basic description of the business processes using Unified Modeling Language (UML). The *UNESCAP Business Process Analysis Handbook for Paperless Trade* provides the guidelines for analysing, documenting, and simplifying business processes.

The following diagrams illustrate the use of UML to visually describe business processes.

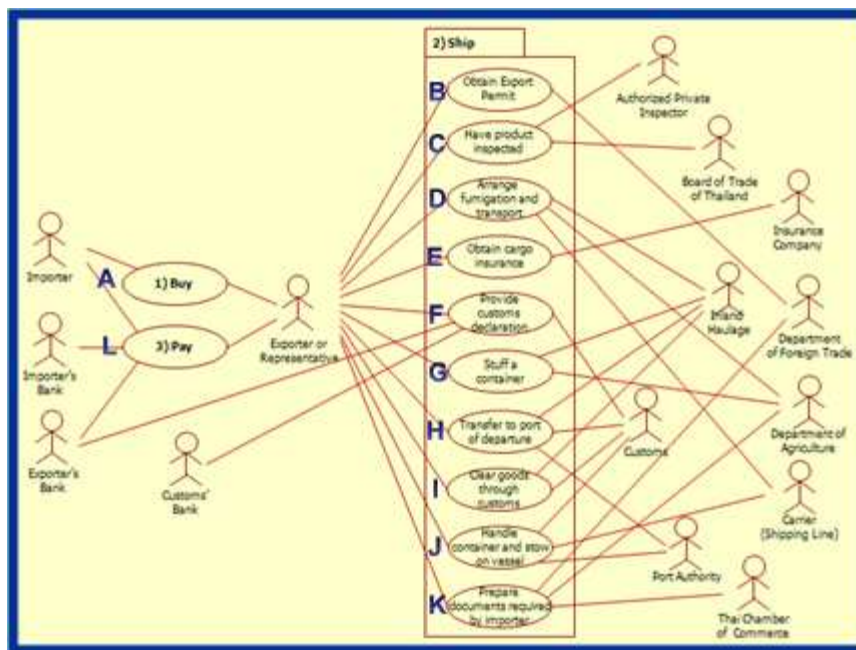


Figure AIV2-12: An Example of Business Domain View: A Frame of Reference for Business Process Modeling and Analysis

The use case diagram provides a Business Domain View that establishes the business context of the business processes to be studied. The example is based on business processes use in the exportation of Thai jasmine rice. Activity diagrams provide an elaboration of each use case in terms of business process attributes, their relationships, and the information flow between participants who perform the business activities in the business process. From these activity diagrams, the list of documents to be modeled and the names of the party or parties who own each document can be drawn.

Next, all the data elements from each document should be listed in a spreadsheet or table format and the number of occurrences of each data element should be analysed.

- List all data elements in an excel sheet
- Analyze the number of occurrence of each data elements

Permit for the Export of Rice (A.4)	MinOccur	MaxOccur
Permit for the Export of Rice (A.4)	1	1
Reference No	1	1
Permit expiration date	1	1
Exporter (name and address)	1	1
Exporter -tax ID	1	1
Exporter - rice exporter ID	1	1
Consignee (name and address)	1	1
Exporter agent (name and address)	0	1
Buyer (name, address, and country)	0	1
Destination country	1	1
Date of shipment	1	1
Mode of transport	1	1
Vessel/flight no.	0	1
Place of departure	1	1
Currency	1	1
Exchange rate	1	1
For Customs	0	1

Figure AIV2-13: Example of Listing of Data Elements in a Document and their Occurrence

Step 2: Define each data element extracted from each document in terms of definition, data type, data format, and data constraints in actual operation

It is necessary that the data modelers have a solid understanding of data elements under the scope of data mapping in terms of definition, data type, data format, and data constraints in actual operation. Ambiguity in how these data elements are used not only delays the process of data mapping, but also creates inconsistent use of Business Information Entities across Data Model Guides.

A Data Dictionary should be created for each document under the scope of harmonization. The Data Dictionaries are then used as a means for future standardization of data definitions and contents. Potential sources of input for the development of a data dictionary are often collected during the business process analysis. Examples are:

- Document/form, with sample filled-in data and/or a box completion guideline if available
- EDI Message Implementation Guide
- User Interface (Data Entry Screens), with its data dictionary if available

A Document Data Dictionary should contain the following pieces of information:

- Document title
- Document purpose
- Name of the document owner
- Identification number for each data element name such as the Box Number in the document
- Data element name from the document to be modeled
- Data element definition in the local language and/or English as given by the owner of the document and/or relevant standard such as a WCO Data Set, UNTDED, and UN/CEFACT Core Component Library
- Data format (alpha, numeric, alpha-numeric) and size (length of a data element value in terms of digits or characters)
- Constraint on the occurrence of each data element (MinOccurs, MaxOccurs)

- Code lists and subsets of code lists

The data modeler should maintain close consultation with the document owner when defining the data elements of a specific document to ensure that the documented data definitions are correct.

Example – Defining data element names and definitions for 2 documents by comparing each data element with TDED

2 documents about exportation of rice

Permit for the export of rice	Rice Quality Certificate	Data Element Name	Definition
weight (kg.)	Net Weight (kg.)	Net Weight (item)	[TDED 6020] The measure of the net weight (mass) of this cross-border trade line item, excluding all packaging.
Unit Price	Price	Unit Price (item)	[TDED 5110] Price per unit of quantity on which an article item amount is calculated.
Name of transport	Ship's name	Name of Transport	[TDED 8212] Name of a specific means of transport such as the vessel name

Figure AIV2-14: Example of Defining Data Element Name and Definitions extracted from two documents used in Thai Jasmine Rice Export

To illustrate the example case from the “Permit for the Export of Rice” based on UNTDED principle, the activity will start by analysing categories of each data elements through the Grouping of Data elements (UNTDED 2005)⁵ as follows:

- Group 1 (1000-1699) documentation, references
- Group 2 (2000-2699) Dates, times, periods of time
- Group 3 (3000-3699) Parties, addresses, places, countries
- Group 4 (4000-4699) Clauses, conditions, terms, instructions
- Group 5 (5000-5699) Amounts, charges, percentages
- Group 6 (6000-6699) Measure identifiers, quantities (other than monetary)
- Group 7 (7000-7699) Goods and articles: descriptions and identifiers
- Group 8 (8000-8699) Transport modes, means and equipments
- Group 9 (9000-9699) Other data elements (Customs, etc.)

For example, the document title “Permit for the Export of Rice” is categorized as the *documentation* in Group 1 (UNTDED 1000) and “Permit expiration date” as the *date* in Group 2 (UNTDED 2079) and so on. Then, the definition of all data elements as well as the representation format and data constraints in actual operation should be specified accordingly (Figure AIV2-15). However, the UN/CEFACT CCL could be on the basis for definition reference in this stage. The definition provided in the CCL could be used for defining data elements; this is partially shown in Figure AIV2-16.

⁵ UNTDED 2005/ISO 7372-2005 (E). Trade Data Elements Directory (TDED), United Nations, New York and Geneva, 2005.

Define each data elements of the Permit for the Export of Jasmine Rice in terms of definition, representation format, and data constraints in actual operation based on UNTDED 2005

Permit for the Export of Rice (A.4)	Data Element Definition	format	MinOccur	MaxOccur
Permit for the Export of Rice (A.4)	[1000] Free text name of a document such as 'Proforma invoice','Commercial invoice'.	an..35	1	1
Reference No	[1004] Reference number identifying a specific document.	an..35	1	1
Permit expiration date	[2079] Date on which an export licence expires	an..19	1	1
Exporter (name and address)	[3336] Name of the party consigning goods as stipulated in the transport contract by the party ordering transport. (This may be the exporter or seller)	an..512	1	1
Exporter - rice exporter ID	[3337] To identify the party consigning goods as stipulated in the transport contract by the party ordering transport	an..17	1	2
Consignee (name and address)	[3132] Name and address of party to which goods are consigned.	an..512	1	1
Exporter agent (name and address)	[3196] Name and address of a party authorised to act on behalf of another party.	an..512	0	1
Buyer (name, address, and country)	[3002] Name and address of a party to which merchandise or services are sold.	an..512	0	1
Destination country	[3216] Name of the country to which the goods are to be delivered to the final consignee or buyer	an..256	1	1
Date of shipment	[2043]Date and optionally time when a consignment of goods departs from last port, airport, or border post of customs territory whence consigned (country of export).	an..19	1	1

Figure AIV2-15: Definition of Data Elements extracted from the Permit for the Export of Jasmine Rice based on UNTDED 2005


ABIE/ BBIE/ ASBIE/ACC/B CC/ASCC/DT/ CC/SC	Dictionary Entry Name (auto generated)	Definition Mandatory
ACC	Document. Details	A collection of data for a piece of written, printed or electronic matter that provides information or evidence.
BCC	Document. Multiple Type. Indicator	An indication of whether or not a document is an aggregation of different types of business
BCC	Document. Identification. Identifier	A unique identifier for this document.
BCC	Document. Type. Code	A code specifying a type of document [Reference United Nations Code List (UNCL) 1001].
BCC	Document. Name. Text	A name, expressed as text, for this specific document.
BCC	Document. Purpose. Text	The purpose, expressed in text, of this document.
BCC	Document. Description. Text	A textual description of this document.
BCC	Document. Issue. Date Time	The date, time, date time or other date time value for the issuance of this document.
BCC	Document. Submission. Date Time	The date, time, date time or other date time value for the formal submission of this document to a
BCC	Document. Receipt. Date Time	The date, time, date time or other date time value for the formal receipt of this document.
BCC	Document. Control Requirement. Indicator	The indication of whether or not a document has specific control requirements.
BCC	Document. Attachment. Binary Object	A binary object that is attached or otherwise appended to this document.
BCC	Document. Creation. Date Time	A date, time, date time or other date time value of a creation of the document.

Figure AIV2-16: Definition of Data Elements from CCL

In addition, the example of Document Data Dictionary made for Certificate of Origin that is issued by a designated authority under the administration of Department of Foreign

Trade, Ministry of Commerce, Thailand is shown in Table AIV2-4. In this case, the definition and data representation format of each data element are drawn from UNTDED.

ORIGINAL

Exporter (name and address)		Reference No.	
Consignee (name and address, including country)		 MINISTRY OF COMMERCE THAILAND	
Date of shipment		Country of destination of goods	
Mode of transport <input type="checkbox"/> Sea <input type="checkbox"/> Road <input type="checkbox"/> Air <input type="checkbox"/> Mail		Supplementary details	
Vessel/Flight No.			
Place of departure			
Shipping mark	No. & kind of pkgs; description of goods	Gross weight, kg, or other quantity	Invoice date & No.
Other information		It is hereby certified that the above mentioned goods originate in Thailand. DEPARTMENT OF FOREIGN TRADE Place and date,..... (Authorized signature)	

No. 397080

Figure AIV2-17: Original of Certificate of Origin of Thailand

Document Title	Certificate of Origin
Document Purpose	A Certificate of Origin is a document/message identifying goods, in which the authority or body authorized to issue it, certifies expressly that the goods to which the certificate relates originate in a specific country.
Name of Document Owner	Ministry of Commerce, Thailand

ID	Data Element Name	Data Element Definition	Format	MinOccur	MaxOccur
1	Exporter (name and address)	TDED 3336: Name (and address) of the party consigning the goods as stipulated in the contract by the party ordering the transport (This may be the exporter or seller.)	an..256	1	1
2	Consignee (name and address including country)	TDED 3132: Name and address of party to which goods are consigned	an..256	1	1
3-1	Date of shipment	TDED 2043: Date and optionally time when a consignment of goods departs from last port, airport, or border post of customs territory whence consigned (country of export).	an..19	1	1
3-2	Mode of transport	TDED 8066: Name of a mode of transport.	an..17	1	1
3	Vessel/flight no.	TDED 8028: To identify a journey of a means of transport, for example voyage number, flight number, trip number.	an..17	0	1
4	Place of departure	TDED 3214: Name of the port, airport or other type of location from which a means of transport is scheduled to depart or has departed.	an..256	1	1
5	Reference No	TDED 1004: Reference number assigned to a document by the issuer.	an..35	1	1
6-1	Certificate of Origin	TDED 1000: Free text name of a document such as 352 for Proforma invoice, 380 for Commercial invoice.	an..35	1	1
6-2	Ministry of Commerce, Thailand	TDED ----: The name, expressed as text, for the party that issues this exchanged document.	an..256	1	1
7	Country of destination of goods	TDED 3014: Name of the country to which a consignment of goods is to be or has been delivered.	an..35	1	1
8	Supplementary details	TDED 4142: Text related to a document.	an..512	0	1
9	Marks and numbers on packages	TDED 7102: Marks and numbers identifying individual packages	an..512	1	unbounded
10-1	<u>No.</u> and kind of packages; description of goods	TDED 7224: Number of packages per goods item packaged in such a way that they cannot be divided without first undoing the package.	n..8	1	unbounded
10-2	No. and kind of packages; <u>description of goods</u>	TDED 7002: Plain language description of the nature of a goods item sufficient to identify it for customs, statistical or transport purposes.	an..512	1	unbounded
11	Gross weight	TDED 6292: Weight (mass) of goods including packaging but excluding the carrier's equipment.	n..14	1	unbounded
12-1	Invoice <u>date</u> & no.	TDED 2377: Date of issue of an invoice.	an..19	0	unbounded
12-2	Invoice date & <u>no.</u>	TDED 1334: Reference number to identify an invoice.	an..35	0	unbounded
13-1	It is hereby certified that the above mentioned goods originate in:	TDED 3238: Name of the country in which the goods have been produced or manufactured, according to criteria laid down for the purposes of application of the Customs tariff, of quantitative restrictions, of any other measure related to trade.	an..35	1	1
13-2	<u>Place</u> and date of issue	TDED 3410: Name of the location where a document was issued and when appropriate, signed or otherwise authenticated.	an..256	1	1
13-3	Place and <u>date of issue</u>	TDED 2007: Date that a document was issued and when appropriate, signed or otherwise authenticated.	an..19	1	1
13-4	Signature and stamp of certifying authority	TDED 4426: Proof that a document has been authenticated indicating where appropriate the authentication party	an..35	1	1
13-5	Place, date, and signature of authorized signatory	TDED 4426: Proof that a document has been authenticated indicating where appropriate the authentication party	an..35	1	1

Table AIV2-4: Example of Document Data Dictionary

Step 3: Analyse the data elements across various documents and organize them in a comparable manner

If harmonizing multiple documents all at once, it is recommended that the data modeler first categorizes Document Data Dictionaries according to the UNLK family shown in Table AIV2-5. For documents that fall into the “Ship” process, the data modeler then determines whether the documents are intended to describe a single consignment, multiple consignments, or transport equipments. For example, the documents that are captured from business processes used in the exportation of Thai jasmine rice (Figure AIV2-14) can be categorized as follows:

Process	UNLK Document Family		Document		
Buy	Commercial Transaction		Proforma Invoice Purchase Order Commercial Invoice Packing List		
Ship	Forwarding and Cargo Handling	Single Consignment	N/A		
		Multiple Consignments	N/A		
		Transport Equipment(s)	TKT 308.2 (Gate Pass) Equipment Interchange Report (EIR)		
	Transport and Related Services	Transport	Single Consignment	Bill of Lading Booking Request Form – Border Crossing Booking Confirmation – Border Crossing Booking Request Form – Inland Transport Booking Confirmation – Inland Transport	
			Multiple Consignments	Manifest	
		Transport Equipment(s)	Container Loading List Container List Message Outward Container List		
	Insurance	Cargo Insurance Application Form Cover Note Insurance Policy			
		Official Controls		Application for Permission to Export Rice (KP. 2) Sales Report (KP 3) Application for the Collection of the Permit for the Export of Rice (A. 3) Permit for the Export of Rice (A. 4) Application for Certificate of Standards of Product (MS. 13) Rice Quality Certificate Certificate of Standards of Products (MS. 24) Application for Phytosanitary Certificate (PQ. 9) Phytosanitary Certificate Application for Certificate of Origin Certificate of Origin Export Declaration Good Transition Control List	
	Pay	Payment		Application for Letter of Credit Letter of Credit Credit Advice Debit Advice Remittance Advice	

Table AIV2-5: Example of Document Categorization

Process	UNLK Document Family		Documents
Buy	Commercial Transaction		<ul style="list-style-type: none"> All documents exchanged between partners in international trade for the invitation to tender, through the exchange between prospective seller and prospective buyer to the inclusion of contract, i.e., Enquiry/Request for quote/Offer invitation; Offer/Quotation; Order; Acknowledgement of order/Pro-forma invoice; Dispatch Advice
Ship	Transport and Related Services	Forwarding and Cargo Handling	<ul style="list-style-type: none"> Instructions from customers to forwarders, i.e., Forwarding instructions Goods receipts, i.e., Forwarder's warehouse receipt; Dock receipt; Warehouse (shed) receipt Advice documents, i.e., Forwarder's advice to import agent, Forwarder's advice to exporter Authorization and instructions, i.e., Delivery order; Handling order; Gate pass Administrative documents, i.e., Forwarder's invoice; Port charges documents
		Transport	<ul style="list-style-type: none"> Contract documents, i.e., Bill of lading; Waybills; Rail and road consignment notes; Dispatch notes for post parcels Receipt documents, i.e., Receipt of goods for carriage; Mate's receipt; Certificate of transport Contents documents listing goods in transport units or means of transport, i.e., Cargo and freight manifests Administrative and legal documents, i.e., Road list; Discharge report Notification documents, i.e., Booking confirmation, Arrival notice; Delivery notices
		Insurance	<ul style="list-style-type: none"> Insurance agreements, i.e., Insurance contract; Insurance policy; Insurance certificate Notification documents, i.e., Insurance notice; Cover note Administrative documents, i.e., Premium notice; Insurer's invoice
	Official Controls		<ul style="list-style-type: none"> Collection of customs duties and taxes safeguarding of revenue, i.e., Customs goods declaration; Cargo Declaration; Customs invoice; Transit bond-notes Quantitative restrictions on exports and imports, i.e., Application for export/import licenses; Export/import licenses Controls and restrictions regarding exchange, i.e., Application for exchange allocation; Foreign exchange permit Sanitary, veterinary and plant controls, i.e., Phytosanitary, Sanitary and Veterinary certificates; Application for such certificates Controls of quality and product standards, i.e., Goods control and inspection certificates; Application for such certificates Granting of preferential treatment for goods of certain origin, i.e., Certificate of origin; Application for such certificates Restrictions imposed to safeguard public security, cultural heritage, etc., i.e., Dangerous goods declaration Collection of foreign trade statistics, i.e., Statistical documents for export/import
Pay	Payment		<ul style="list-style-type: none"> Instructions (or applications) from customers to banks, i.e., Instruction for bank transfer; Application for banker's draft; Application for banker's guarantee; Collection order; Documentary credit application Advice or information from banks to customers or to beneficiaries of payment, i.e., Collection payment advice; Documentary credit payment; Acceptance or negotiation advice; Documentary credit; Banker's guarantee Information exchanged between banks

Table AIV2-6: UNLK Document Family

The data modeler then organizes data elements from the Document Data Dictionaries in a comparable manner. Table AIV2-7 provides a sample template for a document analysis. Each column represents one document. Data elements and their properties shall be recorded in the same row if they have identical definitions.

Doc 1 Document title Document Purpose Name of document owner	Doc 2 Document title Document Purpose Name of document owner	Doc N Document title Document Purpose Name of document owner
ID number Data element name Data definition Data representation format MinOccur MaxOccur	ID number Data element name Data definition Data representation format MinOccur MaxOccur	ID number Data element name Data definition Data representation format MinOccur MaxOccur
ID number Data element name Data definition Data representation format MinOccur MaxOccur		
	ID number Data element name Data definition Data representation format MinOccur MaxOccur	ID number Data element name Data definition Data representation format MinOccur MaxOccur

Table AIV2-7: Sample Template of Document Data Dictionary Compilation

For the purpose of a document mapping in a further step, each Document Data Dictionary Compilation table covers data requirements of documents of the similar nature.



Figure AIV2-18: Document Categorization for Document Analysis

The properties of documents from the commercial transaction and the payment sector can be documented in the same spreadsheet. Those required to fulfill the “Ship” process are more complicated. Because the information that the documents intend to convey dictates

the structure of the documents themselves, the properties of documents that describe a single consignment, multiple consignments, or transport equipment have to be recorded in different spreadsheet. Table AIV2-8 is an example of document data dictionary compilation for documents used in the “Ship” process.

<p>Certificate of Origin A Certificate of Origin certifies expressly that the goods to which the certificate relates originate in a specific country. Department of Foreign Trade, Ministry of Commerce, Thailand</p>	<p>Permit for the Export of Rice (A. 4) Permit for the Export of Rice (A. 4) is only given to rice exporters who follow the Ministry of Commerce's Regulation for Rice Exportation 1997. Department of Foreign Trade, Ministry of Commerce, Thailand</p>	<p>Certificate of Standards of Products (MS. 24) Certificate of Standards of Products (MS. 24) certifies that the rice to be exported has the quality set by importer. Board of Trade of Thailand</p>
<p>5 Reference No TDED 1004: Reference number assigned to a document by the issuer an..35 (Min= 1, Max= 1)</p>	<p>0-2 Reference No TDED 1004: Reference number assigned to a document by the issuer an..35 (Min = 1, Max = 1)</p>	<p>4 Certificate of Standards of Products (MS. 24) -reference ID TDED 1004: Reference number assigned to a document by the issuer an..35 (Min = 1, Max = 1)</p>
<p>6-1 Certificate of Origin TDED 1000: Free text name of a document such as 352 for Proforma invoice, 380 for Commercial invoice. an..35 (Min= 1, Max= 1)</p>	<p>0-1 Permit for the Export of Rice (A. 4) TDED 1000: Free text name of a document such as 352 for Proforma invoice, 380 for Commercial invoice. an..35 (Min = 1, Max = 1)</p>	<p>5 Certificate of Standards of Products (MS. 24) TDED 1000: Free text name of a document such as 352 for Proforma invoice, 380 for Commercial invoice. an..35 (Min = 1, Max = 1)</p>
<p>6-2 Ministry of Commerce, Thailand TDED ----: The name, expressed as text, for the party that issues this exchanged document. an..256 (Min= 1, Max= 1)</p>		
		<p>1 Permit for the Export of Rice (A. 4) - reference no. TDED 1208: Reference number to identify an export licence or permit. an..35 (Min = 1, Max = 1)</p>
		<p>2 Permit for the Export of Rice (A. 4) - date of issue TDED 2007: Date that a document was issued and when appropriate, signed or otherwise authenticated. an..19 (Min = 1, Max = 1)</p>
		<p>3 Application for Certificate of Standards of Product (MS. 13) - reference ID CCL UN01001570: The unique issuer assigned identifier for this referenced document. an..35 (Min = 1, Max = 1)</p>
	<p>0-3 Permit expiration date TDED 2079: Date on which an export licence expires an..19 (Min = 1, Max = 1)</p>	<p>22 Certificate expiration date TDED 2059: Date on which a document expires an..19 (Min = 1, Max = 1)</p>

<p>Certificate of Origin A Certificate of Origin certifies expressly that the goods to which the certificate relates originate in a specific country. Department of Foreign Trade, Ministry of Commerce, Thailand</p>	<p>Permit for the Export of Rice (A. 4) Permit for the Export of Rice (A. 4) is only given to rice exporters who follow the Ministry of Commerce's Regulation for Rice Exportation 1997. Department of Foreign Trade, Ministry of Commerce, Thailand</p>	<p>Certificate of Standards of Products (MS. 24) Certificate of Standards of Products (MS. 24) certifies that the rice to be exported has the quality set by importer. Board of Trade of Thailand</p>
<p>1 Exporter (name and address) TDED 3336: Name (and address) of the party consigning the goods as stipulated in the contract by the party ordering the transport (This may be the exporter or seller.) an..512 (Min= 1, Max= 1)</p>	<p>1-1 Exporter (name and address) TDED 3336: Name (and address) of the party consigning the goods as stipulated in the contract by the party ordering the transport (This may be the exporter or seller.) an..512 (Min = 1, Max = 1)</p>	<p>6 Exporter name TDED 3336: Name of the party consigning the goods as stipulated in the contract by the party ordering the transport (This may be the exporter or seller.) an..256 (Min = 1, Max = 1)</p>
<p>Certificate of Origin A Certificate of Origin certifies expressly that the goods to which the certificate relates originate in a specific country. Department of Foreign Trade, Ministry of Commerce, Thailand</p>	<p>Permit for the Export of Rice (A. 4) Permit for the Export of Rice (A. 4) is only given to rice exporters who follow the Ministry of Commerce's Regulation for Rice Exportation 1997. Department of Foreign Trade, Ministry of Commerce, Thailand</p>	<p>Certificate of Standards of Products (MS. 24) Certificate of Standards of Products (MS. 24) certifies that the rice to be exported has the quality set by importer. Board of Trade of Thailand</p>
	<p>1-2 Exporter - tax ID TDED 3446: To identify a number assigned to a party by a tax authority. an..20 (Min = 1, Max = 1)</p>	<p>8 Exporter - tax ID TDED 3446: To identify a number assigned to a party by a tax authority. an..20 (Min = 1, Max = 1)</p>
	<p>1-3 Exporter - rice exporter ID CCL UN01003641: A unique identifier for this legally set up organization. an..20 (Min = 1, Max = 1)</p>	<p>7 Exporter - rice exporter ID CCL UN01003641: A unique identifier for this legally set up organization. an..20 (Min = 1, Max = 1)</p>
<p>2 Consignee (name, address, country) TDED 3132: Name and address of party to which goods are consigned an..512 (Min= 1, Max= 1)</p>	<p>2 Consignee (name and address) TDED 3132: Name and address of party to which goods are consigned an..512 (Min = 1, Max = 1)</p>	
	<p>3-1 Exporter agent (name and address) TDED 3196: Name and address of a party authorised to act on behalf of another party. an..512 (Min = 0, Max = 1)</p>	
	<p>3-2 Exporter agent - role TDED 3035: Code giving specific meaning to role of a party. an..3 (Min = 0, Max = 1)</p>	
	<p>4 Buyer (name, address, and country) TDED 3002: Name and address of a party to which merchandise or services are sold. an..512 (Min = 0, Max = 1)</p>	
		<p>19 Loading date TDED 2347: Date and optionally time when a consignment is to be or has been loaded onto a means of transport an..19 (Min = 1, Max = 1)</p>

<p>Certificate of Origin A Certificate of Origin certifies expressly that the goods to which the certificate relates originate in a specific country. Department of Foreign Trade, Ministry of Commerce, Thailand</p>	<p>Permit for the Export of Rice (A. 4) Permit for the Export of Rice (A. 4) is only given to rice exporters who follow the Ministry of Commerce's Regulation for Rice Exportation 1997. Department of Foreign Trade, Ministry of Commerce, Thailand</p>	<p>Certificate of Standards of Products (MS. 24) Certificate of Standards of Products (MS. 24) certifies that the rice to be exported has the quality set by importer. Board of Trade of Thailand</p>
<p>3-1 Date of shipment TDED 2043: Date and optionally time when a consignment of goods departs from last port, airport, or border post of customs territory whence consigned (country of export). an..19 (Min= 1, Max= 1)</p>	<p>9-1 Date of shipment (estimated) TDED 2043: Date and optionally time when a consignment of goods departs from last port, airport, or border post of customs territory whence consigned (country of export). an..19 (Min = 1, Max = 1)</p>	
<p>3-2 Mode of transport TDED 8066: Name of a mode of transport an..17 (Min= 1, Max= 1)</p>	<p>9-2 Mode of transport TDED 8066: Name of a mode of transport an..17 (Min = 1, Max = 1)</p>	
<p>3 Vessel/ flight no. TDED 8028: To identify a journey of a means of transport, for example voyage number, flight number, trip number an..17 (Min= 0, Max= 1)</p>	<p>10 Vessel/ flight no. TDED 8028: To identify a journey of a means of transport, for example voyage number, flight number, trip number an..17 (Min = 0, Max = 1)</p>	
<p>Certificate of Origin A Certificate of Origin certifies expressly that the goods to which the certificate relates originate in a specific country. Department of Foreign Trade, Ministry of Commerce, Thailand</p>	<p>Permit for the Export of Rice (A. 4) Permit for the Export of Rice (A. 4) is only given to rice exporters who follow the Ministry of Commerce's Regulation for Rice Exportation 1997. Department of Foreign Trade, Ministry of Commerce, Thailand</p>	<p>Certificate of Standards of Products (MS. 24) Certificate of Standards of Products (MS. 24) certifies that the rice to be exported has the quality set by importer. Board of Trade of Thailand</p>
<p>4 Place of departure TDED 3214: Name of the port, airport or other type of location from which a means of transport is scheduled to depart or has departed an.. 256 (Min= 1, Max= 1)</p>	<p>11 Place of departure TDED 3214: Name of the port, airport or other type of location from which a means of transport is scheduled to depart or has departed an.. 256 (Min = 1, Max = 1)</p>	<p>20 Place of departure TDED 3214: Name of the port, airport or other type of location from which a means of transport is scheduled to depart or has departed an.. 256 (Min = 1, Max = 1)</p>
<p>7 Country of destination of goods TDED 3014: Name of the country to which a consignment of goods is to be or has been delivered. an..35 (Min= 1, Max= 1)</p>	<p>5 Destination country TDED 3216: Name of the country to which the goods are to be delivered to the final consignee or buyer an..35 (Min = 1, Max = 1)</p>	<p>21 Country of destination of goods TDED 3014: Name of the country to which a consignment of goods is to be or has been delivered. an..35 (Min = 1, Max = 1)</p>
<p>8 Supplementary details TDED 4142: Text related to a document. an..512 (Min= 0, Max= 1)</p>		
	<p>12 Line item TDED 1082: An identifier differentiating an individual line item from within a series an..6 (Min = 1, Max = unbounded)</p>	
	<p>17 Price (FOB) TDED 5032: Amount declared for customs purposes of those goods in a consignment which are subject to the same customs procedure, and have the same tariff/statistical heading, country information and duty regime n..18 (Min = 1, Max = unbounded)</p>	<p>13 FOB Amount TDED 5032: Amount declared for customs purposes of those goods in a consignment which are subject to the same customs procedure, and have the same tariff/statistical heading, country information and duty regime n..18 (Min = 1, Max = unbounded)</p>

<p>Certificate of Origin A Certificate of Origin certifies expressly that the goods to which the certificate relates originate in a specific country. Department of Foreign Trade, Ministry of Commerce, Thailand</p>	<p>Permit for the Export of Rice (A. 4) Permit for the Export of Rice (A. 4) is only given to rice exporters who follow the Ministry of Commerce's Regulation for Rice Exportation 1997. Department of Foreign Trade, Ministry of Commerce, Thailand</p>	<p>Certificate of Standards of Products (MS. 24) Certificate of Standards of Products (MS. 24) certifies that the rice to be exported has the quality set by importer. Board of Trade of Thailand</p>
<p>9 Marks and numbers on packages TDED 7102: Marks and numbers identifying individual packages an..512 (Min= 1, Max= unbounded)</p>		<p>18 Marks and numbers on packages TDED 7102: Marks and numbers identifying individual packages an..512 (Min = 1, Max = unbounded)</p>
<p>10-2 Description of goods TDED 7002: Plain language description of the nature of a goods item sufficient to identify it for customs, statistical or transport purposes an..512 (Min= 1, Max= unbounded)</p>	<p>13 Description of goods TDED 7002: Plain language description of the nature of a goods item sufficient to identify it for customs, statistical or transport purposes an..512 (Min = 1, Max = unbounded)</p>	
<p>10-1 No. and kind of packages TDED 7224: Number of packages per goods item packaged in such a way that they cannot be divided without first undoing the package n..8 (Min= 1, Max= unbounded)</p>		<p>14 Quantity TDED 7224: Number of packages per goods items packaged in such a way that they cannot be divided without first undoing the packing. n..8 (Min = 1, Max = unbounded)</p>
<p>11 Gross weight TDED 6292: Weight (mass) of goods including packaging but excluding the carrier's equipment. n..14 (Min= 1, Max= unbounded)</p>		
<p>Certificate of Origin A Certificate of Origin certifies expressly that the goods to which the certificate relates originate in a specific country. Department of Foreign Trade, Ministry of Commerce, Thailand</p>	<p>Permit for the Export of Rice (A. 4) Permit for the Export of Rice (A. 4) is only given to rice exporters who follow the Ministry of Commerce's Regulation for Rice Exportation 1997. Department of Foreign Trade, Ministry of Commerce, Thailand</p>	<p>Certificate of Standards of Products (MS. 24) Certificate of Standards of Products (MS. 24) certifies that the rice to be exported has the quality set by importer. Board of Trade of Thailand</p>
	<p>15 Net weight TDED 6016: Weight (mass) of goods item excluding all packing n..16 (Min = 1, Max = unbounded)</p>	<p>12 Net weight TDED 6016: Weight (mass) of goods item excluding all packing n..16 (Min = 1, Max = unbounded)</p>
	<p>14 Commodity code TDED 7133: Code qualifying a type of product details. an..3 (Min = 1, Max = 1)</p>	
		<p>9 Product name TDED 7134: Name identifying a product. an..35 (Min = 1, Max = 1)</p>
		<p>10 Product type TDED 7036: Free form description of a characteristic. an..35 (Min = 1, Max = 1)</p>

<p>Certificate of Origin A Certificate of Origin certifies expressly that the goods to which the certificate relates originate in a specific country. Department of Foreign Trade, Ministry of Commerce, Thailand</p>	<p>Permit for the Export of Rice (A. 4) Permit for the Export of Rice (A. 4) is only given to rice exporters who follow the Ministry of Commerce's Regulation for Rice Exportation 1997. Department of Foreign Trade, Ministry of Commerce, Thailand</p>	<p>Certificate of Standards of Products (MS. 24) Certificate of Standards of Products (MS. 24) certifies that the rice to be exported has the quality set by importer. Board of Trade of Thailand</p>
		<p>11 Product classification CCL UN01002612: A class name, expressed as text, for this product classification. an..70 (Min = 0, Max = 1)</p>
	<p>16 Unit price TDED 5110: Price per unit of quantity on which an article item amount is calculated n..18 (Min = 1, Max = unbounded)</p>	<p>17 Unit price TDED 5110: Price per unit of quantity on which an article item amount is calculated n..18 (Min = 1, Max = unbounded)</p>
		<p>15 Net weight - package TDED 6026: Weight (mass) of a package including all packing n..16 (Min = 1, Max = unbounded)</p>
		<p>16 Gross weight - package TDED 6022: Weight (mass) of a package excluding all packing n..16 (Min = 1, Max = unbounded)</p>
<p>12-1 Invoice date TDED 2377: Date of issue of an invoice an..19 (Min=0, Max= unbounded)</p>		
<p>12-2 Invoice no. TDED 1334: Reference number to identify an invoice an..35 (Min=0, Max= unbounded)</p>		
<p>13-1 Other information TDED 4440: Free form description of information details. an..256 (Min=0, Max= unbounded)</p>	<p>6 For Customs TDED 4440: Free form text. an..512 (Min = 0, Max = 1)</p>	
	<p>7 Currency TDED 6343: Code specifying a type of currency. an..3 (Min = 1, Max = 1)</p>	
<p>Certificate of Origin A Certificate of Origin certifies expressly that the goods to which the certificate relates originate in a specific country. Department of Foreign Trade, Ministry of Commerce, Thailand</p>	<p>Permit for the Export of Rice (A. 4) Permit for the Export of Rice (A. 4) is only given to rice exporters who follow the Ministry of Commerce's Regulation for Rice Exportation 1997. Department of Foreign Trade, Ministry of Commerce, Thailand</p>	<p>Certificate of Standards of Products (MS. 24) Certificate of Standards of Products (MS. 24) certifies that the rice to be exported has the quality set by importer. Board of Trade of Thailand</p>

Certificate of Origin A Certificate of Origin certifies expressly that the goods to which the certificate relates originate in a specific country. Department of Foreign Trade, Ministry of Commerce, Thailand	Permit for the Export of Rice (A. 4) Permit for the Export of Rice (A. 4) is only given to rice exporters who follow the Ministry of Commerce's Regulation for Rice Exportation 1997. Department of Foreign Trade, Ministry of Commerce, Thailand	Certificate of Standards of Products (MS. 24) Certificate of Standards of Products (MS. 24) certifies that the rice to be exported has the quality set by importer. Board of Trade of Thailand
13-2 goods originate in: TDED 3238: Name of the country in which the goods have been produced or manufactured, according to criteria laid down for the purposes of application of the Customs tariff, of quantitative restrictions, of any other measure related to trade. an..35 (Min= 1, Max= 1)		
	8 Exchange rate TDED 5402: The rate at which one specified currency is expressed in another specified currency. n..18 (Min = 1, Max = 1)	
13-3 Place of issue TDED 3410: Name of the location where a document was issued and when appropriate, signed or otherwise authenticated. an..256 (Min= 1, Max= 1)		
13-4 Date of issue TDED 2007: Date that a document was issued and when appropriate, signed or otherwise authenticated. an..19 (Min= 1, Max= 1)	18-1 Date of issue TDED 2007: Date that a document was issued and when appropriate, signed or otherwise authenticated. an..19 (Min = 1, Max = 1)	23 Date of issue TDED 2007: Date that a document was issued and when appropriate, signed or otherwise authenticated. an..19 (Min = 1, Max = 1)
13-5 Signature and stamp of certifying authority TDED 4426: Proof that a document has been authenticated indicating where appropriate the authentication party an..35 (Min= 1, Max= 1)		
13-6 Place, date, and signature of authorized signatory TDED 4426: Proof that a document has been authenticated indicating where appropriate the authentication party an..35 (Min= 1, Max= 1)	18-2 Signature and stamp of certifying authority TDED 4426: Proof that a document has been authenticated indicating where appropriate the authentication party an..35 (Min = 1, Max = 1)	24 Signature and stamp of authorized signatory TDED 4426: Proof that a document has been authenticated indicating where appropriate the authentication party an..35 (Min = 1, Max = 1)

Table AIV2-8 Example of Document Data Dictionary Compilation

Step 4: Reconcile or map core data elements to a reference data model

The mapping starts after the Document Data Dictionary Compilation developed in Step 3 is verified by the owners of the documents and agreed upon by all relevant stakeholders. By mapping documents of a similar category to a reference data model, inconsistencies in interpreting data definition and selecting the equivalent Dictionary Entry Names (DENs) are reduced.

The reference data model used as the basis for mapping the core data elements extracted from documents used in the export process of jasmine rice in Thailand is mainly the CCTS and the CCL. For each Document Data Dictionary Compilation resulting from the completion of Step 3, the data modeler maps each definition of a data element with the equivalent DENs.

The data modeler has to go through CCL, look for relevant Dictionary Entry Names, identify the path of the selected BBIE for each data definition, and correctly document the finding in the template for mapping documentation/message implementation guide. The spreadsheet contains 3 worksheets as follows:

- i. The worksheet provides reusable high-level message structures which can be used for the definition of multiple subset document structures. The sequence of Association Business Information Entities (ASBIEs) provides the structure of a reusable message pattern drawn from the highest-level structures in the UN/CEFACT D08B Core Component Library. To maximise semantic interoperability, it is recommended that these structures should be strictly followed when defining national, regional or community-based derived document structures and guidelines.

ASBIEs are CCTS-based structures made up of components. Ultimately they consist of data elements at different levels. These components are either simple data elements known as Basic Business Information Entities (BBIEs) or complex data elements (ASBIE) or both.

- ii. The Business Information Entity (BIE) worksheet lists all details of the Aggregate Business Information Entities (ABIEs). These details include UN assigned Unique IDs, dictionary entry names, definitions and cardinalities.

B	C	D	E
Unique UN Assigned ID	ABIE/ BBIE/ ASBIE/ACC/ BCC/ASCC/D T/CC/SC	Dictionary Entry Name (auto generated)	Definition Mandatory
UN01002572	ASBIE	Cross-Border_ Transport Movement. Used. Cross-Border_ Transport Means	The cross-border transport means used for this cross-border transport movement.
UN01003837	ABIE	Logistics_ Transport Movement. Details	The conveyance (physical carriage) of goods or other objects used for logistics transport purposes.
UN01003838	BBIE	Logistics_ Transport Movement. Stage. Code	The code specifying the stage of this logistics transport movement.
UN01003839	BBIE	Logistics_ Transport Movement. Mode. Code	The code specifying the mode, such as by air, sea, rail, road or inland waterway, for this logistics transport movement.
UN01003840	BBIE	Logistics_ Transport Movement. Mode. Text	The mode, expressed as text, of this logistics transport movement.

Figure AIV2-19: Example of Dictionary Entry Names

For example, the structure of the ABIE called Supply Chain_ Consignment. Details, which is one of the high-level library ABIEs, can be found in the BIE worksheet. In Figure AIV2-19, key characteristics of ABIE, ASBIE, and BBIE can be seen.

BIE	Characteristics
ABIE	Logistics_ Transport Movement. Details Object Class Term + Details
BBIE	Logistics_ Transport Movement. Mode. Code Object Class Term + Property Term + Representation Term (where representation term refers to CCTS data type, i.e., amount, binary object, code, date time, identifier, indicator, measure, numeric, quantity, and text)
ASBIE	Logistics_ Transport Movement. Used. Logistics_ Transport Means Object Class Term + Property Term + Object Class Term of Associated ABIE

Table AIV2-9: Key Characteristics of BIEs

It is then a straightforward effort to find the transport mode name as it is a simple data element within this ABIE. Data modelers can then document a mapping to the Cross-Border_ Transport Movement. Mode.Text BBIE.

However, finding a Dictionary Entry Name that is equivalent to a vessel name requires another step. Because a vessel name is seen as an attribute of a means of transport, its dictionary entry name is therefore listed under Logistics_ Transport Means. Details, which is an ABIE associated from the ABIE Logistics_ Transport Movement.

Data Element Name	ASBIE	BBIE
Transport Mode Name	Logistics_ Transport Movement	Logistics_ Transport Movement. Mode. Text
Vessel Name	Logistics_ Transport Movement Cross-Border_ Transport Movement. Used. Logistics_ Transport Means	Logistics_ Transport Means. Name. Text

Table AIV2-10: Mapping Documentation

- iii. The ACC worksheet contains core components structures from the UN/CEFACT Core Component Library

Step 5: Obtain the structure of the element document

To obtain the structure of the element document in XML format, the tag names are to be generated according to the XML Naming and Design Rules (NDR) based on the Dictionary Entry Name created according to the CCTS rules as shown in Table AIV2-11 below.

However, since Thailand is in the process of proposing the establishment of “Thailand XML Schema Naming and Design Rules (Thailand NDR)” for use among Government agencies and private sectors, the development of XML schema is not yet done according to the national standard but based on the experimental self design schema suitable for the Thai context.

Data type	Dictionary Entry Name	Object Class Qualifier	Object Class Term	Property Qualifier	Property Term	Representation Term
<ABIE>	History_Person. Detail	History	Person		Detail	
<BBIE>	History_Person. Identification. Identifier	History	Person		Identification	Identifier
<BBIE>	History_Person. Firstname. Text	History	Person		Firstname	Text
<BBIE>	History_Person. Lastname. Text	History	Person		Lastname	Text
<BBIE>	History_Person. Birthdate. Date	History	Person		Birth	Date
<ASBIE>	History_Person. Office. Address	History	Person		Office	Address
<ASBIE>	History_Person. Home. Address	History	Person		Home	Address
<ABIE>	Office_Address. Detail	Office	Addresses		Detail	
<BIE>	Office_Address. Identification. Identifier	Office	Address		Identification	Identifier
<BIE>	Office_Address. Address. Text	Office	Address		Address	Text

Table AIV2-11: Example of Data Dictionary Names and Their Data Structures

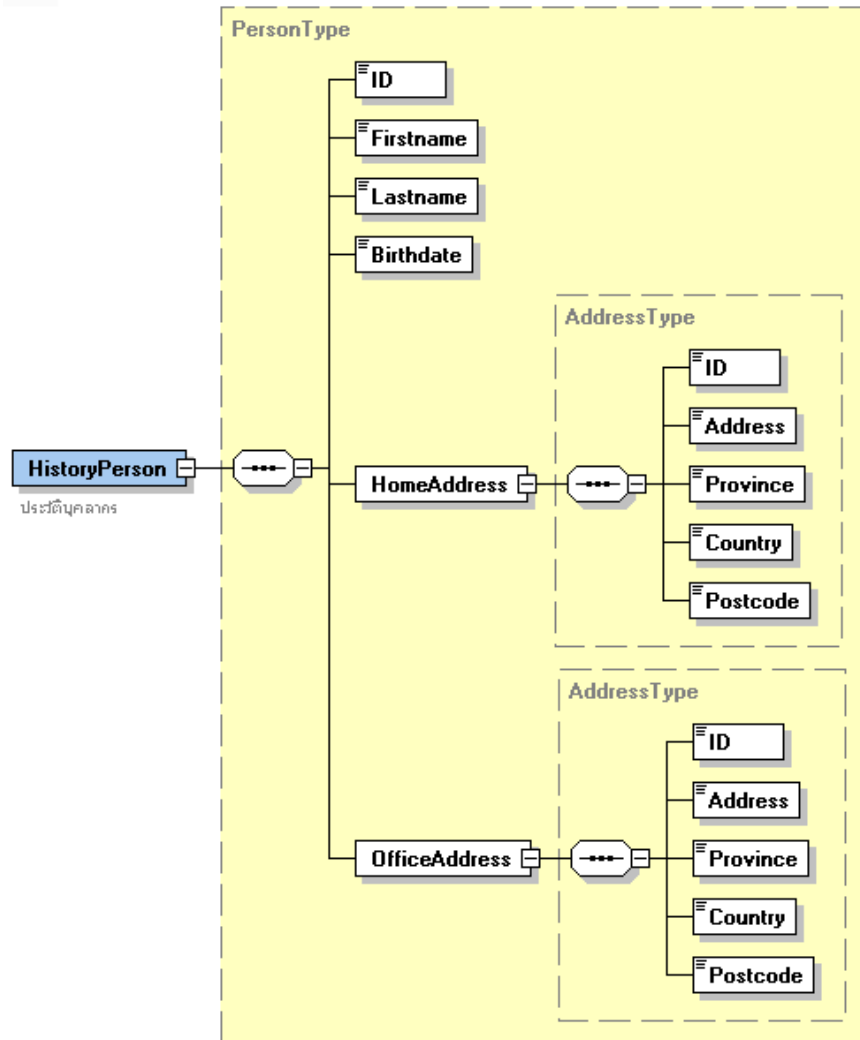


Figure AIV2-20: Example of Data Model generated from the Table of Dictionary Entry Name


```

1  <?xml version="1.0" encoding="UTF-8"?>
2  <xsd:schema xmlns:xsd="http://www.w3.org/2001/XMLSchema"
   elementFormDefault="qualified" attributeFormDefault="unqualified">
3  <xsd:element name="HistoryPerson" type="PersonType">
4  <xsd:annotation>
5  <xsd:documentation>ประวัติบุคคล/</xsd:documentation>
6  </xsd:annotation>
7  </xsd:element>
8  <xsd:complexType name="PersonType">
9  <xsd:sequence>
10 <xsd:element name="ID" type="xsd:ID"/>
11 <xsd:element name="Firstname" type="xsd:string"/>
12 <xsd:element name="Lastname" type="xsd:string"/>
13 <xsd:element name="Birthdate" type="xsd:date"/>
14 <xsd:element name="HomeAddress" type="AddressType"/>
15 <xsd:element name="OfficeAddress" type="AddressType"/>
16 </xsd:sequence>
17 </xsd:complexType>
18 <xsd:complexType name="AddressType">
19 <xsd:sequence>
20 <xsd:element name="ID" type="xsd:ID"/>
21 <xsd:element name="Address" type="xsd:string"/>
22 <xsd:element name="Province" type="xsd:string"/>
23 <xsd:element name="Country" type="xsd:string"/>
24 <xsd:element name="Postcode" type="xsd:string"/>
25 </xsd:sequence>
26 </xsd:complexType>
27 </xsd:schema>

```

Figure AIV2-21: Example of XML Schema generated from the above Data Model

AIIV2-4. Additional Example of Data Harmonization

This additional example of data harmonization is intended to illustrate more of the actual implementation of data harmonization using the step-by-step approach to data harmonization. The example will show, once again, those individual steps for a clearer picture and better understanding of the data harmonization practice. It is based on the other selected form entitled “Certificate of Pesticide Residues” to be issued by the Department of Agriculture, Ministry of Agriculture and Cooperatives, Thailand, which is used as part of the export process of Thai jasmine rice and contains information in English.

Step 1: Capture business processes to identify documents in the information flow

- The selected form entitled “Certificate of Pesticide Residues” issued by the Department of Agriculture, Ministry of Agriculture and Cooperatives, Thailand, as shown in Figure AIIV2-22 is a document required for an importation of jasmine rice. It could be acquired through the business process of “Ship - Prepare documents required by importer” as highlighted in blue in the diagram below. In the process, an exporter or representative needs to prepare the necessary documents to be submitted for application for the Certificate used in the import formalities of jasmine rice.

COPY



CERTIFICATE OF PESTICIDE RESIDUES
 DEPARTMENT OF AGRICULTURE
 MINISTRY OF AGRICULTURE AND COOPERATIVES
 BANGKOK 10900, THAILAND

871617

BK.NO.

REF.NO.

COMMON NAME		Mango		64P	
LAB.	NO.	LOT SIZE	DATE	ANALYSIS :	
8995	00161	50 kg.	27 January 1998	SHIPMENT :	
MANUFACTURER OR SHIPPER			ADDRESS		
ASIA PACIFIC...			...		
VENDOR OR CONSIGNEE			ADDRESS		
SHELDON...			...		
PORT OF ENTRY OR EMBARKATION			TRANSPORTATION		
ENGLAND			AIR		
REPORT OF PESTICIDE RESIDUE(S) ANALYSIS					
METHOD OF ANALYSIS : Steinwandter H. 1985. Universal 5 min on - line Method for Extracting and Isolating Pesticide Residues and Industrial Chemicals. Fresenius Z.Anal. Chem. No. 1155.					
DETERMINATION : Organophosphates, Pyrethroids and others residues.					
RESULT : Based on Sample Submitted					
Mango : OrganophosphatesNot detectable					
PyrethroidsNot detectable					
Organophosphates group : DDVP, methamidophos, diazinon, chlorpyrifos, pirimiphos ethyl, pirimiphos methyl, parathion, parathion methyl, mevinphos, malathion, profenofos, prothiophos, monocrotophos, dimethoate, omethoate, dicrotophos, phosalone, triazophos, fenitrothion, methidathion, ethion, EPN and azinphos ethyl					
Pyrethroids group : permethrin, cypermethrin, cyhalothrin, fenvalerate, cyfluthrin and deltamethrin					
Others group : endosulfan					
ANALYST COMPLETED BY:					
CONCLUSIONS					
RECOMMENDATION					
<input checked="" type="checkbox"/> ACCEPTED <input type="checkbox"/> NOT ACCEPTED BASED ON MRL OF <input type="checkbox"/> CODEX <input checked="" type="checkbox"/> EU <input type="checkbox"/> JAPAN <input type="checkbox"/> ASEAN <input type="checkbox"/> USA					
APPROVED					
BY :					

FORM PRL- BE USED TO REPORT A LABORATORY EXAMINATION

NO. 081907

Figure AIV2-22: Example of Certificate of Pesticide Residues

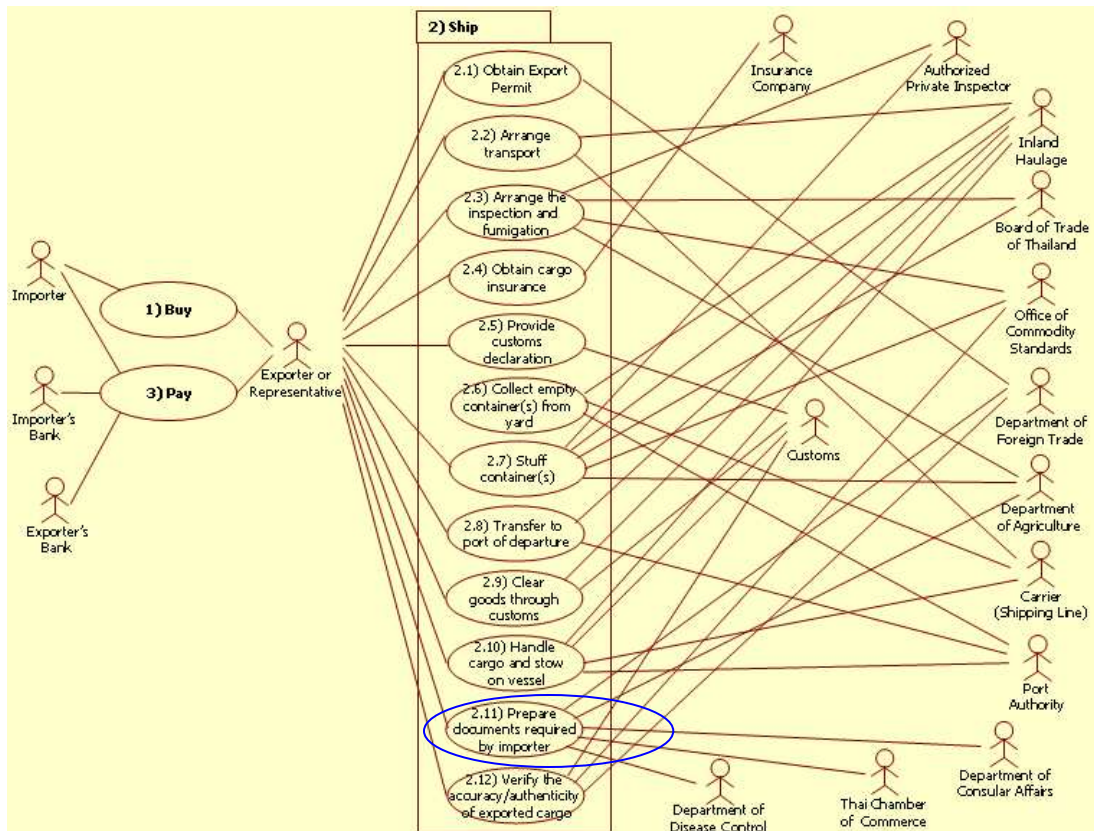


Figure AIV2-23: The Business Process 2.11 requiring the Certificate of Pesticide Residues

Step 2: Define each data element extracted from each document in terms of definition, data type, data format, and data constraints in actual operation

- A data analyst extracts all data elements from the Certificate of Pesticide Residues and records the field headings (the name of the data element as shown in a form) in the first column of the spreadsheet. The occurrence of each data element is analysed and also listed in the second and third column of the spreadsheet. (as shown in Figure AIV2-24 below.)

Certificate of Pesticide Residues (Data Element Name)	MinOccur	MaxOccur
Document Name	1	1
Document No.	1	1
BK No.	1	1
Ref No.	1	1
Common Name	1	1
Lab	0	1
No.	0	1
Lot Size	1	1
Analysis Date	1	1
Shipment Date	1	1
Manufacturer or Shipper Name	1	1
Manufacturer or Shipper Address	1	1
Vendor or Consignee Name	1	1
Vendor or Consignee Address	1	1
Port of Entry or Embarkation	1	1
Transportation	1	1
Method of Analysis	1	unbounded
Determination	1	unbounded
Result	1	unbounded
Analyst Name	1	1
Completed By	1	1
Conclusions	0	1
Recommendation	0	1
Accepted/Not Accepted	1	1
Based on	1	1
Approved By	1	1

Figure AIV2-24: Example of Listing of Data Elements Extracted from the Certificate of Pesticide Residues and Their Occurrence

- A data analyst then establishes a description and naming for each data element extracted from the Certificate of Pesticide Residues, based on the reference standard of UNTDED 2005. The description includes the data definition, representation format, and the number of times that a particular type of data could appear in the form. A definition of equivalent semantic meaning in the reference international standard should be searched for and recorded accordingly in the spreadsheet with a unique identification number for the definition as identified in that reference standard. If the representation is a code, code lists should also be provided. Table A-12 illustrates the data definition, representation format, and

the number of occurrences of each data elements extracted from the Certificate of Pesticide Residues, based on the reference standard of UNTDED 2005.

Data Element Name	Definition	Format	MinOccur	MaxOccur
Document Name	[1000] Free text name of the document	an..35	1	1
Document No.	[1004] Reference number identifying a specific document.	an..35	1	1
BK No. Ref No.	[1010] Identifier of a document providing additional information. [1024] Free text name of an additional document.	an..35 an..35	1	2
Common Name	[7134] Name identifying a product	an..35	1	1
Lab	An action taken for an event by or in behalf of the party.	an..3	0	1
No.	An action taken for an event by or in behalf of the party.	an..35	0	1
Lot Size	[6292] Weight (mass) of goods including packaging but excluding the carrier's equipment.	n..16	1	1
Analysis Date	Date of an examination event for this consignment.	an..19	1	1
Shipment Date	[2043] The date, time, date time, or other date time value when this cross-border consignment will exit, or has exited from the last port, airport, or border post of the country of export.	an..19	1	1
Manufacturer or Shipper Name	[3336] Name of the party consigning goods as stipulated in the transport contract by the party ordering transport	an..512	1	1
Manufacturer or Shipper Address	[3336] The address of the party consigning goods as stipulated in the transport contract by the party ordering transport	an..512	1	1
Vendor or Consignee Name	[3132] The name of the party to which the goods are consigned	an..512	1	1
Vendor or Consignee Address	[3132] The address of the party to which the goods are consigned	an..512	1	1
Port of Entry or Embarkation	[3014] Name of the country to which a consignment of goods is to be or has been delivered.	an..256	1	1
Transportation	[8067] A mode, expressed as text, of this transport movement, such as by air, sea, rail, road or inland waterway.	an..17	1	1
Method of Analysis	[4078] Free form description of a set of handling instructions. For example how specified goods, packages or transport equipment (container) should be handled.	an..512	1	unbounded
Determination	[9285] Code specifying the validation criteria to be applied.	an..35	1	unbounded
Result	[9280] To specify the value of a validation result.	an..35	1	unbounded

Data Element Name	Definition	Format	MinOccur	MaxOccur
Analyst Name	[9417] Code specifying a type of government action such as inspection, detention, fumigation, security.	an..35	1	1
Completed By	[4426] Proof that a document has been authenticated indicating where appropriate the authentication party	an..35	1	1
Conclusions	[4428] Proof that a document has been signed.	an..35	0	1
Recommendation	[4344] Free form description of a response.	an..256	0	1
Accepted/Not Accepted	[4343] Code specifying the type of acknowledgment required or transmitted.	an..3	1	1
Based on	[4443] Indication whether the place specified for the performance of a (contractual) obligation is located in the country where the declaration is made, in another member country of the same economic or Customs union, or in a third country.	an..3	1	1
Approved By	[4426] Proof that a document has been authenticated indicating where appropriate the authentication party	an..35	1	1

Table AIV2-12: Example of Description provided for each Data Elements extracted from the Certificate of Pesticide Residues, based on the reference standard of UNTDED 2005

- When looking for the definition, the data analyst may start with the smallest set of data elements in the reference standard such as UNTDED. However, if that reference standard does not contain what the data analyst is looking for, he/she may consider searching for the definition in another standard with larger set of data elements such as the UN/CEFACT Core Component Library (CCL). Data elements in UN/CEFACT CCL have been described according to the approach defined in UN/CEFACT Core Components Technical Specifications (CCTS:ISO 15000-5/ebXML). It is formulated as a tripartite name which consists of an object class term (denoting a category of “things”), a property term (specifying a specific attribute of a “thing”), and a representation term (indicating a format in which data regarding a particular attribute of a thing should be presented). According to CCTS, data elements are organized into two major categories: 1) Core Component (CC) - a component that is context-neutral and reusable across various business domains, and 2) Business Information Entity (BIE) - a contextualized Core Component. To develop a definition for a particular data element using definitions from UN/CEFACT CCL, the data analyst first needs to first work with the worksheet of “Reference-BIE” and the worksheet of “CC”.

Step 3: Analyse data elements across various documents and organize them in a comparable manner (*when working with multiple documents*)

- Since this example is for one document, the data elements analysis across various documents is not needed. However, if working with multiple documents, it is necessary to standardize the rationalized national data set by mapping it to the UNTDED 2005. The standardized national data set can be compared with other national data sets to reach regional or international agreements for the simplification of data requirements.

Step 4: Map core data elements to a reference data model

- Map extracted core data elements and create data structures based on CCL and CCTS by working on the worksheet of “CC”. A Core Component (CC) is a building block for development of a semantically correct and meaningful business information exchange parcel containing the information pieces needed to describe a specific concept. There are four categories of Core Components: Basic Core Component; Association Core Component; Core Component Type (data type) and Aggregate Core Component. Table AIV2-13 shows data structure of data elements based on CCL. Table AIV2-14 shows data structures of data elements by core component level of data based on CCL.

Data Element	Definition	CC			Format	MinOccur	MaxOccur
		ACC	ASCC	BCC			
Document Name	[1000] Free text name of the document	Document. Details		Document. Identification. Identifier	an..35	1	1
Document No.	[1004] Reference number identifying a specific document.	Document. Details		Document. Name. Text	an..35	1	1
BK No. Ref No.	[1010] Identifier of a document providing additional information. [1024] Free text name of an additional document.	Document. Details	Document. Reference. Document	Document. Identification. Identifier Document. Name. Text	an..35 an..35	1	2
Common Name	[7134] Name identifying a product	Product. Details		Product. Name. Text	an..35	1	1
Lab	An action taken for an event by or in behalf of the party.	Consignment Item. Details	Consignment Item. Examination. Event. Occurrence. Location	Location. Type. Code	an..3	0	1
No.	An action taken for an event by or in behalf of the party.	Consignment Item. Details	Consignment Item. Examination. Party Party. Action. Event. Event. Occurrence. Location	Location. Identification. Identifier	an..35	0	1

Data Element	Definition	CC			Format	MinOccur	MaxOccur
		ACC	ASCC	BCC			
Lot Size	[6292] Weight (mass) of goods including packaging but excluding the carrier's equipment.	Consignment Item. Details		Consignment Item. Gross Weight. Measure	n..16	1	1
Analysis Date	Date of an examination event for this consignment.	Consignment Item. Details	Consignment Item. Examination. Event	Event. Occurrence. Date Time	an..19	1	1
Shipment Date	[2043] The date, time, date time, or other date time value when this cross-border consignment will exit, or has exited from the last port, airport, or border post of the country of export.	Consignment. Details		Consignment. Export Exit. Date Time	an..19	1	1
Manufacturer or Shipper Name	[3336] Name of the party consigning goods as stipulated in the transport contract by the party ordering transport	Consignment. Details	Consignment. Consignor. Party	Party. Name. Text	an..512	1	1
Manufacturer or Shipper Address	[3336] The address of the party consigning goods as stipulated in the transport contract by the party ordering transport	Consignment. Details	Consignment. Consignor. Party. Specified. Address	Address. Postcode. Text Address. Line One. Text Address. Line Two. Text Address. Line Three. Text Address. Line Four. Text Address. Line Five. Text	an..17 an..512 an..512 an..512 an..512	1	1
Vendor or Consignee Name	[3132] The name of the party to which the goods are consigned	Consignment. Details	Consignment. Consignee. Party	Party. Name. Text	an..35 an..3	1	1
Vendor or Consignee Address	[3132] The address of the party to which the goods are consigned	Consignment. Details	Consignment. Consignee. Party. Specified. Address	Address. Postcode. Text Address. Line One. Text Address. Line Two. Text Address. Line Three. Text Address. Line Four. Text Address. Line Five. Text	an..17 an..512 an..512 an..512 an..512	1	1
Port of Entry or Embarkation	[3014] Name of the country to which a consignment of goods is to be or has been delivered.	Consignment. Detail	Consignment. Final Destination. Location	Location. Name. Text	an..256	1	1
Transportation	[8067] A mode, expressed as text, of this transport movement, such as by air, sea, rail, road or inland waterway.	Consignment. Details	Consignment. Main Carriage. Transport Movement	Transport Movement. Mode. Text	an..17	1	1

Data Element	Definition	CC			Format	MinOccur	MaxOccur
		ACC	ASCC	BCC			
Method of Analysis	[4078] Free form description of a set of handling instructions. For example how specified goods, packages or transport equipment (container) should be handled.	Consignment Item. Details	Consignment Item. Handling. Instructions	Instruction. Handling. Text	an..512	1	unbounded
Determination	[9285] Code specifying the validation criteria to be applied.	Consignment Item. Details	Consignment Item. Applicable. Validation	Validation. Criteria. Text	an..35	1	unbounded
Result	[9280] To specify the value of a validation result.	Consignment Item. Details	Consignment Item. Applicable. Validation	Validation. Result. Text	an..35	1	unbounded
Analyst Name	[9417] Code specifying a type of government action such as inspection, detention, fumigation, security.	Analysis. Details	Analysis. Execution. Party Party. Specified. Person	Person. Name. Text	an..35	1	1
Completed By	[4426] Proof that a document has been authenticated indicating where appropriate the authentication party	Document. Details Authentication. Details	Document. Signatory. Authentication Authentication. Provider. Party	Party. Name. Text	an..35	1	1
Conclusions	[4428] Proof that a document has been signed.	Document. Details		Document. Endorsement. Text	an..35	0	1
Recommendation	[4344] Free form description of a response.	Response. Details	Document. Reference. Response	Response. Content. Text	an..256	0	1
Accepted/Not Accepted	[4343] Code specifying the type of acknowledgment required or transmitted.	Reponse. Details	Document. Reference. Response	Response. Type. Code	an..3	1	1
Based on	[4443] Indication whether the place specified for the performance of a (contractual) obligation is located in the country where the declaration is made, in another member country of the same economic or Customs union, or in a third country.	Consignment Item. Details	Consignment Item. Examination. Party Party. Action. Event. Event. Occurrence. Location	Location. Country Name. Text	an..3	1	1
Approved By	[4426] Proof that a document has been authenticated indicating where appropriate the authentication party	Document. Details		Document. Authentication. Text	an..35	1	1

Table AIV2-13: Data Structures by Core Component Level of Data Based on CCL

- From the table above, data structures could be partially presented, as an example, in the form of Class Diagram as shown below in Figure AIV2-26:

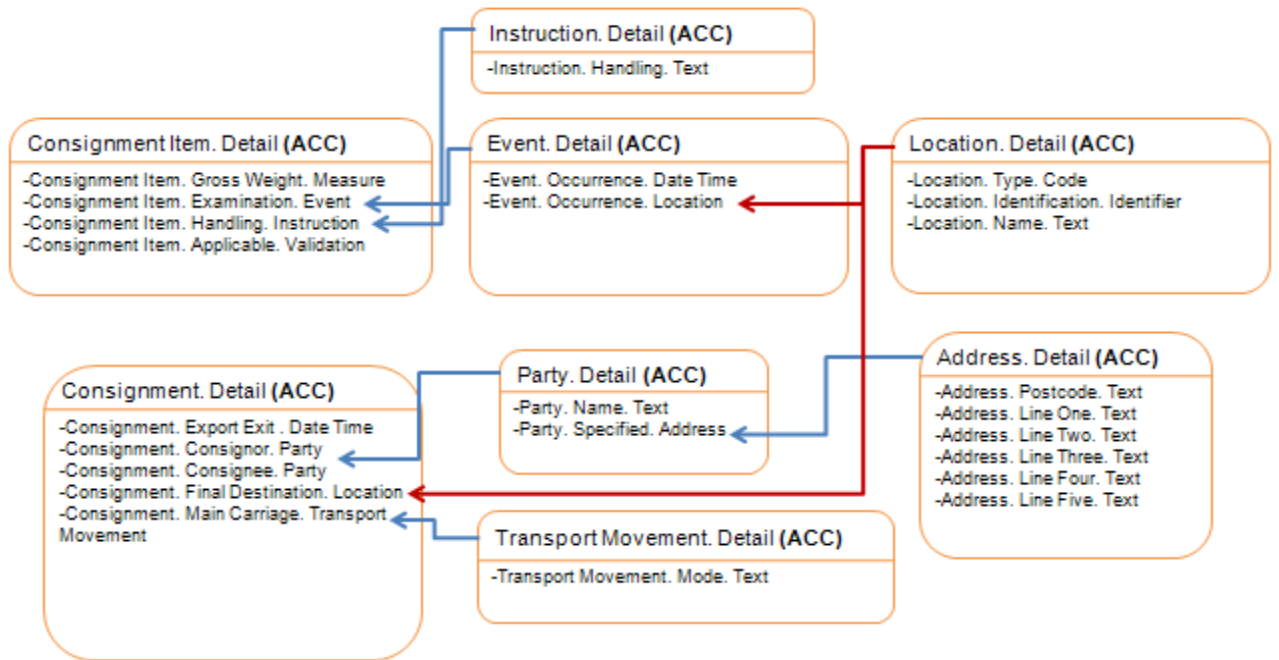


Figure AIV2-26: Example of Data Structure by Core Component Level of Data based on CCL

- Map extracted core data elements and create data structures based on CCL and CCTS by using the worksheet “Reference-BIE”. A Business Information Entity (BIE) is a piece of business data or a group of pieces of business data with a unique Business Semantic definition in a specific Business Context. A Business Information Entity can be a Basic Business Information Entity (BBIE), an Association Business Information Entity (ASBIE), or an Aggregate Business Information Entity (ABIE). A BBIE is based on a Basic Core Component (BCC). An ASBIE is based on an Association Core Component (ASCC). An ABIE is a re-use of an Aggregate Core Component (ACC) in a specified Business Context. The below Table AIV2-14 shows data structures of data elements by core component level of data plus business context based on CCL.

Data Element	Definition	ASBIE	BBIE	Format	MinOccur	MaxOccur
Document Name	[1000] Free text name of the document	Bi. Header. Exchanged_Document	Exchanged_Document. Name. Text	an..3 5	1	1
Document No.	[1004] Reference number identifying a specific document.	Bi. Header. Exchanged_Document	Exchanged_Document. Identification. Identifier	an..3 5	1	1
BK No. Ref No.	[1010] Identifier of a document providing additional information. [1024] Free text name of an additional document.	Bi. Header. Exchanged_Document Exchanged_Document. Reference. Referenced_Document	Referenced_Document. Identification. Identifier Referenced_Document. Name. Text	an..3 5 an..3 5	1	2
Common Name	[7134] Name identifying a product	Bi. Contract. Cross-Border_Consignment Cross-Border_Consignment. Included. Cross-Border_Consignment Item	Cross-Border_Consignment Item. Common_Name. Text	an..3 5	1	1
Lab	An action taken for an event by or in behalf of the party.	Bin. Contract. Cross-Border_Consignment Cross-Border_Consignment. Included. Cross-Border_Consignment Item Cross-Border_Consignment Item. Examination. Examination_Event Referenced_Event. Occurrence. Referenced_Location	Referenced_Location. Type. Code	an..3	0	1
No.	An action taken for an event by or in behalf of the party.	Bin. Contract. Cross-Border_Consignment Cross-Border_Consignment. Included. Cross-Border_Consignment Item Cross-Border_Consignment Item. Examination. Examination_Event Referenced_Event. Occurrence. Referenced_Location	Referenced_Location. Identification. Identifier	an..3 5	0	1
Lot Size	[6292] Weight (mass) of goods including packaging but excluding the carrier's equipment.	Bi. Contract. Cross-Border_Consignment Cross-Border_Consignment. Included. Cross-Border_Consignment Item	Cross-Border_Consignment Item. Gross Weight. Measure	n..16	1	1
Analysis Date	Date of an examination event for this consignment.	Bi. Contract. Cross-Border_Consignment Cross-Border_Consignment. Included. Cross-Border_Consignment Item Cross-Border_Consignment Item. Examination. Examination_Event	Examination_Event. Occurrence. Date Time	an..1 9	1	1
Shipment Date	[2043] The date, time, date time, or other date time value when this cross-border consignment will exit, or has exited from the	Bi. Contract. Cross-Border_Consignment	Cross-Border_Consignment. Export Exit. Date Time	an..1 9	1	1

	last port, airport, or border post of the country of export.					
Manufacturer or Shipper Name	[3336] Name of the party consigning goods as stipulated in the transport contract by the party ordering transport	Bi. Contract. Cross-Border_ Consignment Consignor. Referenced_Party	Referenced_Party. Name. Text	an..5 12	1	1
Manufacturer or Shipper Address	[3336] The address of the party consigning goods as stipulated in the transport contract by the party ordering transport	Bi. Contract. Cross-Border_ Consignment Consignor. Referenced_Party Referenced_Party. Specified. Unstructured_Address	Unstructured_Address. Postcode. Text Unstructured_Address. Line One. Text Unstructured_Address. Line Two. Text Unstructured_Address. Line Three. Text Unstructured_Address. Line Four. Text Unstructured_Address. Line Five. Text	an..1 7 an..5 12 an..5 12 an..5 12 an..5 12	1	1
Vendor or Consignee Name	[3132] The name of the party to which the goods are consigned	Bi. Contract. Cross-Border_ Consignment Consignee. Referenced_Party	Referenced_Party. Name. Text	an..3 5 an..3	1	1
Vendor or Consignee Address	[3132] The address of the party to which the goods are consigned	Bi. Contract. Cross-Border_ Consignment Consignee. Referenced_Party Referenced_Party. Specified. Unstructured_Address	Unstructured_Address. Postcode. Text Unstructured_Address. Line One. Text Unstructured_Address. Line Two. Text Unstructured_Address. Line Three. Text Unstructured_Address. Line Four. Text Unstructured_Address. Line Five. Text	an..1 7 an..5 12 an..5 12 an..5 12	1	1
Port of Entry or Embarkation	[3014] Name of the country to which a consignment of goods is to be or has been delivered.	Bi. Contract. Cross-Border_ Consignment. Final Destination. Referenced_Location	Referenced_Location. Name. Text	an..2 56	1	1
Transportation	[8067] A mode, expressed as text, of this transport movement, such as by air, sea, rail, road or inland waterway.	Bi. Contract. Cross-Border_ Consignment. Main Carriage. Cross-Border_ Transport Movement	Cross-Border_ Transport Movement. Mode. Text	an..1 7	1	1
Method of Analysis	[4078] Free form description of a set of handling instructions. For example how specified goods, packages or transport equipment (container) should be handled.	Bi. Contract. Cross-Border_ Consignment. Included. Cross-Border_ Consignment Item. Handling. Handling_Instructions	Handling_Instructions. Handling. Text	an..5 12	1	unbound

Determination	[9285] Code specifying the validation criteria to be applied.	Bi. Contract. Cross-Border_ Consignment Cross-Border_ Consignment. Included. Cross-Border_ Consignment Item Cross-Border_ Consignment Item. Included. Applicable. Product_ Validation	Product_ Validation. Criteria. Text	an..3 5	1	unbound
Result	[9280] To specify the value of a validation result.	Bi. Contract. Cross-Border_ Consignment Cross-Border_ Consignment. Included. Cross-Border_ Consignment Item Cross-Border_ Consignment Item. Included. Applicable. Product_ Validation	Product_ Validation. Result. Text	an..3 5	1	unbound
Analyst Name	[9417] Code specifying a type of government action such as inspection, detention, fumigation, security.	Bi. Contract. Cross-Border_ Consignment Cross-Border_ Consignment. Included. Cross-Border_ Consignment Item Cross-Border_ Consignment Item. Analysis_ Execution. Referenced_ Party	Referenced_ Party. Person Name. Text	an..3 5	1	1
Completed By	[4426] Proof that a document has been authenticated indicating where appropriate the authentication party	Bi. Header. Exchanged_ Document Exchanged_ Document. Signatory. Document_ Authentication Document_ Authentication. Provider. Referenced_ Party	Referenced_ Party. Name. Text	an..3 5	1	1
Conclusions	[4428] Proof that a document has been signed.	Bi. Header. Exchanged_ Document	Exchanged_ Document. Endorsement. Text	an..3 5	0	1
Recommendation	[4344] Free form description of a response.	Bi. Header. Exchanged_ Document Exchanged_ Document. Reference. Referenced_ Response	Referenced_ Response. Content. Text	an..2 56	0	1
Accepted/Not Accepted	[4343] Code specifying the type of acknowledgment required or transmitted.	Bi. Header. Exchanged_ Document Exchanged_ Document. Reference. Referenced_ Response	Referenced_ Response. Type. Code	an..3	1	1
Based on	[4443] Indication whether the place specified for the performance of a (contractual) obligation is located in the country where the declaration is made, in another member country of the same economic or Customs union, or in a third country.	Bi. Contract. Cross-Border_ Consignment Cross-Border_ Consignment. Included. Cross-Border_ Consignment Item Cross-Border_ Consignment Item. Examination. Referenced_ Party Referenced_ Party. Action. Event_ Location	Event_ Location. Country Name. Text	an..3	1	1

Approved By	[4426] Proof that a document has been authenticated indicating where appropriate the authentication party	Bi. Header. Exchanged_ Document	Exchanged_ Document. Authentication. Text	an..3 5	1	1
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Table AIV2-14: Data structures of Data Elements by Core Component Level of Data Plus Business Context Based on CCL

AIV2-5. Application of outputs from Data Harmonization project in Single Window

As mentioned in Chapter 2 of the Guide, the outputs of data harmonization provide a basis for establishing a seamless information exchange through the Single Window facility. They provide semantic rules that can be used to govern domestic sharing and integration of electronic data at least within the border. The same set of data attributes and semantic rules that are incorporated in information systems in the data sharing network will help them commonly interpret the exchanged data and automatically process it to achieve intended business objectives.

With the case of Thai exportation of jasmine rice, the present process could be generally described and illustrated as follows:

1. First, an exporter prepares and submits a document entitled “Application for the Collection of the Permit for the Export of Rice (A.3)” to the Foreign Trade Department.
2. The Foreign Trade Department checks and verifies the submitted information of A.3 and then issues a Permit for the Export of Rice (A.4) for the exporter.
3. The exporter receives the Permit for the Export of Rice (A.4) and prepares an Application for Certificate of Product Standards (MS. 13/1) to be submitted to the Thai Chamber of Commerce.
4. The Thai Chamber of Commerce checks and verifies the Application for Certificate of Product Standards (MS. 13/1) and the Permit for the Export of Rice (A.4) and then informs the exporter to inspect the products.
5. The exporter contacts a surveyor for product inspection.
6. Upon completing the product inspection, the surveyor issues a certificate of product inspection to report the result to the exporter.
7. The exporter submits the certificate of product inspection to the Thai Chamber of Commerce to request for the Certificate of Product Standards (MS.24/1)
8. The Thai Chamber of Commerce issues the Certificate of Product Standards (MS.24/1) for the exporter.
9. The exporter submits an Export Declaration through the paperless system of the Royal Thai Customs Department.
10. To clear goods through Customs, the exporter submits the Permit for the Export of Rice (A.4) and the Certificate of Product Standards (MS.24/1) to customs authorities at a port of exit for product inspection and release.

Example of Jasmine Rice Export Process (present)

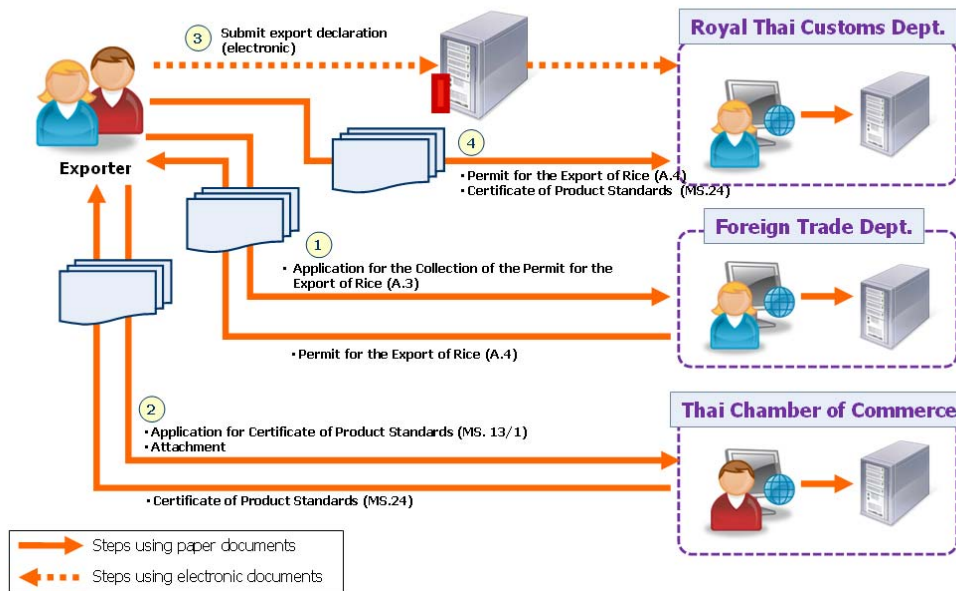


Figure AIV2-27: Example of Jasmine Rice Export Process in Thailand (present)

Currently, exporters need to prepare the following three documents for submitting each of them individually to each agency one at a time:

1. Export Declaration containing 159 data elements for electronic submission
2. Application for the Collection of the Permit for the Export of Rice (A.3) containing 36 data elements
3. Application for the Certificate of Product Standards (MS. 13/1) containing 34 data elements

This means the exporters have to fill in a total of 229 data elements and pay at least three physical visits to the responsible agencies to submit and receive documents prior to product release at the port of departure, which are:

1. Visit the Foreign Trade Department to submit the Application for the Collection of the Permit for the Export of Rice (A.3) and receive the Permit for the Export of Rice (A.4)
2. Visit the Thai Chamber of Commerce to submit the Application for Certificate of Product Standards (MS. 13/1) and the Permit for the Export of Rice (A.4)
3. Visit the Thai Chamber of Commerce to submit the certificate of product inspection and receive the Certificate of Product Standards (MS.24/1)
4. At a port of exit, all documents are submitted to Customs for product inspection and release.

However, upon implementing the data harmonization of three documents, for example, the data elements are reduced from 229 (159+36+34) data elements to 169 data elements

for a standardized data set. Exporters can prepare these data elements for electronic submission without any personal visit to agencies. Those submitted data will be sent electronically through the automated SWE system to the relevant agencies for their processes.

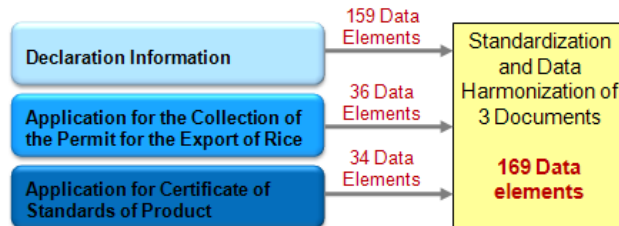


Figure AIV2-28: Example of Data Harmonization of 3 Documents for Jasmine Rice Export

In the future, when the data harmonization is achieved and finally delivers the output such as the semantic standard, it will be based on coordinated development of individual information systems used in different stages. The information systems development team can follow the semantic standard to develop different components of an information system, which are 1) class diagrams of all object-oriented language based applications, 2) structures and definitions of database tables, 3) schema for the external data interchange interfaces, and 4) layout and structure of the user interfaces. The simplified data requirements and decrease in data redundancy and inconsistency along with specific common data elements and a standardized data set could lead to lesser time for document preparation and reduced cost for the export process of jasmine rice in the long run.

The example of jasmine rice export process in the future is described and illustrated as shown below.

1. An exporter prepares documents namely an Export Declaration, an Application for the Collection of the Permit for the Export of Rice (A.3) and an Application for Certificate of Product Standards (MS. 13/1) and then submits them electronically through the system of Single Window Entry (by Value-Added Services Providers)
2. The Single Window Entry (SWE) system will transfer the information to a National Single Window (NSW)
3. The National Single Window (NSW) will send the information from the Application for the Collection of the Permit for the Export of Rice (A.3) to the Foreign Trade Department, the information of Application for Certificate of Product Standards (MS. 13/1) to the Thai Chamber of Commerce, and the information of Export Declaration to the Royal Thai Customs Department.
4. Upon its verification, the Foreign Trade Department will sign off a Permit for the Export of Rice (A.4) and send it to the SWE via NSW.
5. The SWE system will send the information contained in the A.4 and information retrieved from the Application for Certificate of Product Standards (MS. 13/1) that was sent in earlier by the exporter to the Thai Chamber of Commerce.

- The Thai Chamber of Commerce verifies the Application for a Certificate of Product Standards (MS. 13/1) and the Permit for the Export of Rice (A.4) and then informs the exporter to inspect the products.

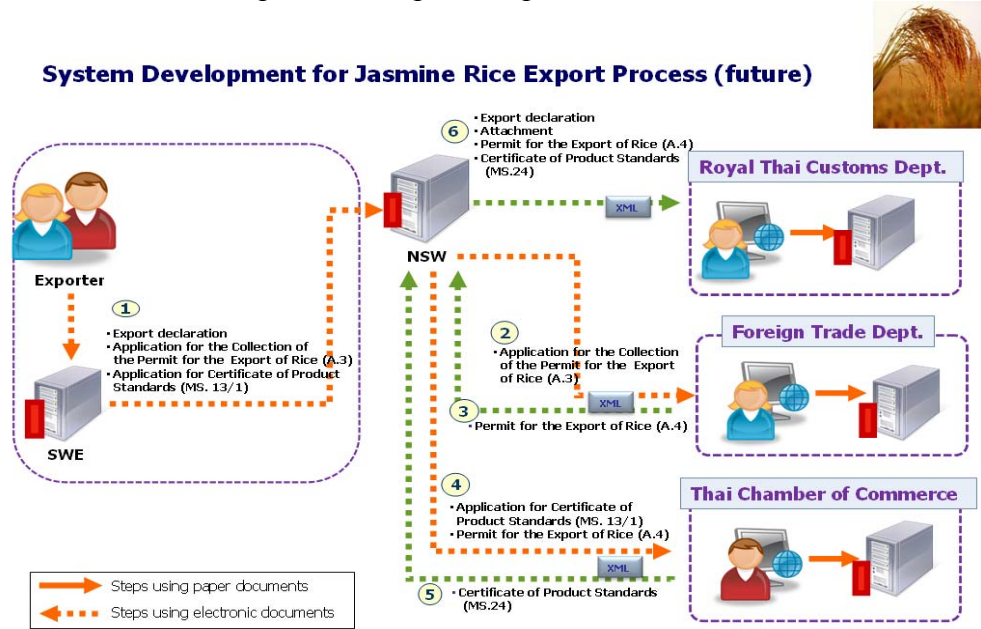


Figure AIV2-29: Example of Jasmine Rice Export Process in Thailand (future)

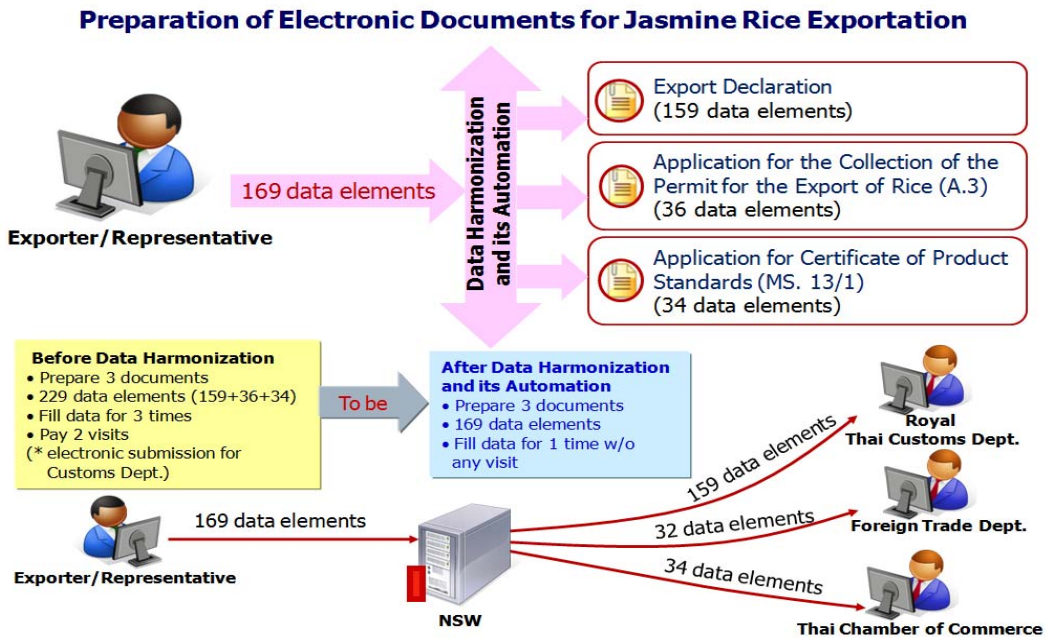


Figure AIV2-30: Preparation of Documents for Jasmine Rice Exportation of Thailand