



**WCO Data Model,  
SINGLE WINDOW DATA HARMONISATION**

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## 1 Introduction

**A Single Window environment sure is a complex technical issue, but it cannot work without the politics and other non-IT issues being examined first.**

**Please be sure to get the policy, legal and administrative frameworks analysed and sorted before looking at technical options.**

In many countries the design and development of automated systems and the establishment of information and data requirements are often done with little co-ordination among regulatory agencies and with little co-ordination and consultation of other government agencies. As a result Trade<sup>1</sup> must comply with a variety of electronic messages and forms resulting in increased costs and in many cases inaccurate data.

A Single Window environment would provide a solution to the problem of the different electronic messages and would improve the accuracy of the use of data if internationally agreed standards are being used such as the WCO Data Model.

## 2 Scope

The scope of these Guidelines is to provide

- Single Window environment developers with tools that can be used in order to achieve data harmonisation. Internationally standardised, in the context of these Guidelines, are the data element names, definitions, the UNTDED<sup>2</sup> tag and the format<sup>3</sup>.
- Single Window users with tools based on best practices that have been successfully employed by countries where Single Window systems are being developed or have been implemented.

## 3 Benefits

The use of non-standard, country-specific, and / or agency-specific data is highly inefficient in terms of cost and accuracy for both government and trade. Governments are required to maintain or develop agency-specific systems and Trade must develop and maintain interfaces for these redundant and duplicative reporting requirements. This is also evident in non-automated,

<sup>1</sup> Traders include importers, exporters, carriers, brokers, freight forwarders, etc .

<sup>2</sup> United Nations Trade Data Element Directory 2005/ ISO 7372:2005

<sup>3</sup> Elements from the UNTDED have been used according the WCO Data Model standards as much as possible



paper-based systems where Trade is required to provide highly redundant forms.

The situation is especially critical for large global traders who must interact with many Customs Administrations and many other government agencies. The cost and complexity of meeting these requirements is staggering. Not only large global traders but also SMEs<sup>4</sup> will benefit as well.

The use of international standards in data and messaging for export, transit transactions and import, where the same data and messages can be submitted to all government agencies including Customs will be the core foundation of a Single Window environment. The use of the WCO Data Model will ensure compatibility among government agencies' reporting requirements and will enable the exchange and information sharing among relevant government agencies including Customs, resulting in greater facilitation towards Trade.

As governments begin the development of a standardised, multi-agency data set there might be a concern about the number of data elements. To keep the number of data requirements as small as possible, the intent is to include in the standardised data set only that information which the agencies are currently allowed to collect, the "need-to-have-list" of information requirements.

The discovery of redundancy of data that would be revealed during the data harmonisation process and the ensuing standardisation, often results in reduction of data requirements.

Another benefit is the stability a standardised set of data requirements provides. The outcome of the data harmonisation must be a maximum set of data requirements for the export, transport and import of goods when crossing borders. Governments should not require any information outside of the standard data set. It is important to note that most of the data requirements of the WCO Data Model are Conditional. National Governments will use the WCO Data Model with its maximum data set to derive its National all\_of\_government border crossing data model.

#### **4 Recommendation**

It is recommended that governments considering the development or developing a Single Window environment should initiate the data harmonisation and standardisation process. It is also recommended that countries that have a Single Window in place and not executed a data harmonisation would also conduct such a harmonisation. These guidelines

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<sup>4</sup> Small and Medium Enterprises.



sets forth the steps governments should implement in the harmonisation process as follows:

1. Identify the lead agency and dedicating staff to conduct the harmonisation,
2. Inventory current trade agency data and information requirements from automated systems and forms,
3. Nationally harmonise data and information inventory
4. Identify redundancies by comparing data definitions
5. Harmonise the information and data requirements inventory to the international WCO Data Model standards.

## **5 Guidelines on Single Window Data Harmonisation**

### **5.1 Introduction**

These guidelines are designed to assist Governments and Trade in harmonising and standardising government international trade information and data requirements in order to develop and implement a Single Window environment. These guidelines are based upon best practices and Single Window environment implementations and may be used in conjunction with UN/CEFACT Recommendation 33.

These guidelines will provide details on policy and organisation matters necessary to achieve the aimed harmonisation. They also provide tools that governments can employ to facilitate the harmonisation process, details on domestic harmonisation, and the eventual harmonisation of domestic requirements to the WCO Data Model

### **5.2 Objective**

The objective of data harmonisation in comparison with the WCO Data Model is to eliminate redundancies in required data and duplication in the submission of trade data to Government authorities such as Customs and other regulatory agencies. The ultimate outcome should be one set of standardised data requirements and standardised messages that fully comply with the WCO Data Model. Within cross border transactions Trade will provide the required WCO Data Model data elements by submitting standardised messages to meet government requirements for, export, transit and import. This will facilitate trade, reduce costs and make it feasible to provide more timely and accurate information.



### 5.3 Harmonisation Policy, Organisation, and Communication

#### 5.3.1 Harmonisation Policy

UN/EDFAC Recommendation 33 lists key factors in establishing a successful Single Window environment. All of these factors are critical for the development of a Single Window environment. A strong lead agency is critical to a successful outcome of the harmonisation process. It is the lead agency that will be responsible for drafting the planning and committing the resources necessary.

#### 5.3.2 Organisation

It is best to have a project team executing the data harmonisation process. The project team members must have extensive knowledge of international trade procedures specifically the area of regulatory information requirements. The harmonisation project team should also include data architects<sup>5</sup> and Business Process modellers. It is also helpful to dedicate a person to serve as a liaison to the participating agencies. This liaison serves as a conduit for information to and from the lead agency. Also, the participating agencies must identify a primary contact to for organising the agency's data inventory and harmonisation.

#### 5.3.3 Communication

Communication of the harmonisation policy, procedures, and steps is critical. After organising the harmonisation project team, the next step is to hold a series of meeting and briefings for all participating agencies to clearly define the roles and responsibilities of the harmonisation project team. After this "kick-off" briefing the agency participants should understand the overall process by which data harmonisation will be accomplished, the purpose of one-on-one meetings with the data architects and business process modellers. They should also identify the work sessions the agency should participate in and the approach planned for these work sessions. Needless to say that the participants are well aware of agency's responsibilities

### 5.4 Data Harmonisation process steps

Data harmonisation is an iterative process of capturing, defining, analysing, and reconciling regulatory information requirements. It is highly unlikely that any government will be able to achieve harmonisation of all agencies at one time. Governments should consider prioritising agencies and agencies' requirements. The prioritisation of requirements could be based on volume, revenue, supply chain security, etc. For example, every international trade transaction requires information for Customs,

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<sup>5</sup> A data architect in tis scenario is a person responsible for making sure a Government's strategic goal is created or optimised through the use of WCO Data Model standards.



transportation, and statistics and may be considered as the first tier of agencies.

The selection of an agency could be based on its willingness and desire to participate in the Single Window.

The important point is that after completing the first tier of agencies, the Data Harmonisation process steps have to be repeated as additional agencies participate and as additional requirements are identified.

### **5.4.1 The Data Harmonisation process steps are defined as follows:**

#### **5.4.1.1 Data Capturing**

Data Capturing means making an inventory of identified regulatory agencies' requirements. This can be accomplished in a number of ways such as the reviewing of agencies' forms, automated systems data requirements, regulations, etc. This includes the data element name, data element definition, representation (format or code), when the information is required (declaration, release, clearance) and citation of the relevant authority to collect, validate and view the information. This information can be aggregated in an Excel spreadsheet or work sheets from any other software tool.

#### **5.4.1.2 Defining**

Defining the information requirement is critical. While information is identified by name, the data element definition -what information is conveyed by using that data element- is more important.

#### **5.4.1.3 Analysing**

The process of analysing the information consists of gathering similar data element names and having a full understanding of the definition and the information required.

#### **5.4.1.4 Reconciling**

This is the final step in which there is agreement to use one data element name, a common definition, common code, and standard messaging reconciled with the WCO Data Model standard.

## **6 Specific illustrations of the Data harmonisation process steps:**

### **6.1 Capturing**

In order to capture data elements and other information requirements developers of a Single Window environment can begin by reviewing forms. If the country has an automated trade processing system, data elements can be found by using the systems' logical data model. Initially, data can be arranged on a worksheet. The worksheet should contain the following



information: data element name, data element description (definition), domain the data element belongs to, representation (alpha, numeric, or alpha-numeric, number of positions, delimiter), domain (code list), mode of transport (marine, air, rail, road), process (export, transit, import), whether it is used for conveyance, crew, cargo or goods (more specific than cargo) or equipment and the data source (exporter, carrier, importer, customs broker, driver, agent, bank, insurance company, psi company, etc).

Another important element is the legal authority to collect the data. It needs to be filed whether the agency is authorised to collect and/or view the data, the source of the legal authority (law, regulation, executive order, etc.) and the expiry date of such authority.

***Recommended worksheet columns are as follows:***

- Agency data element number - A reference number for the data element.
- Data element name - The name of the data element being defined. The naming of the data element should reflect the common business terminology used by the agency, not a computer related name
- Data element description - A description of the data element with as much detail as possible.
- Representation - The data type can be either N (Numeric), A(Alpha) or AN Alphanumeric and the number of positions as well as whether a delimiter – floating or non-floating- is needed).
- Data domain - If the data element has a discrete list of values or a range of values, provide the list, range or a reference to the list or range. For example, the data element *country* could be restricted to the values in the ISO country code table.
- Mode of transport - Indicate the mode of transport (road, air, marine, rail, pipeline, cable) for which the element is used.
- Process - Indicate if required for export, transit processes or import.
- Category of use - Indicate if required for conveyance, crew, cargo, goods, or equipment.
- Legal permission to collect or view - This information identifies whether the agency is legally permitted to collect or view this element. If authority allows collections, enter the word COLLECT, otherwise please enter VIEW
- Source of legal authority - Cite the source of authority to collect or to view. The authority may be derived from a specific form, a regulation, legislative mandate, MOU<sup>6</sup> or other. Please cite all legal authorities that apply if there are multiple sources. Do not provide the text of the citation.
- Expiration date of legal authority - Provide the date on which the legal permission to view or collect the data expires for the agency. Specify N/A<sup>7</sup> if this authority doesn't expire.

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<sup>6</sup> Memorandum Of Understanding

<sup>7</sup> Not Applicable





- **Data source** - Indicate if the information is provided by Trade, Government, or derived from other sources. <Trade> indicates the data is filed by Trade, <Government> indicates the data is created by a regulatory agency. An example of the latter would be the findings from an investigation. If unsure, enter a letter <U> here for unknown. <Derived> data is calculated by or extracted from a reference file, e.g. the rate of duty could be extracted from a Harmonised Tariff file or derived by the computer system from a combination of one or more other data elements.
- **Trade Source** - Indicate the trading partner who is the usual source or provides the data. If the data source attribute is <Trade> please identify which party in the transaction is responsible for filing the data element. Suggested values are <T> (importer, exporter, broker, forwarder, etc.). <C> (carrier) or <TC>. If unsure, enter a letter <U> here for unknown
- **Timing, when data is required and provided** - Identify the point of the transaction's lifecycle at which the agency expects have access to the data element. Suggested values are: <PRE-ARRIVAL>, <ARRIVAL>, <RELEASE>, <CLEARANCE> <POST RELEASE> or <DATAWAREHOUSE> etc.). If unsure, enter a letter <U> here for unknown.
- **Agency flow source** - If the "Data Source" is <Gopvernment>, identify the agency that creates this element.
- **Remarks/Comments** - Free form text that can be used to annotate the data element in any way

Upon receipt of the worksheet survey from the agencies, the data harmonisation project team must aggregate or merge the agency responses into a comprehensive worksheet. The following is an abbreviated representative sample of this aggregation.

NAME	DESCRIPTION	TYPE	SOURCE	MODE
Port of Unloading	Location where goods are removed from the ship	4 digit proprietary code	Carrier	Ship
Port of unloading	Airport where consignment is taken off the airplane	4 digit proprietary code	Carrier	Air
Domestic Port of Unloading	Domestic port where merchandise is removed mode of transport	4 digit proprietary code UNLOCODE	Carrier Broker Importer	Air, Rail, Ship, Truck
Domestic Port of Unlading	Domestic airport where consignment is taken off the airplane	UNLOCODE	Carrier	Air
Foreign Port of Unloading	Foreign port where merchandise is unloaded from the conveyance	5 digit proprietary code	Carrier Exporter	Air, Rail, Ship, Truck
Foreign Port of Unlading	Foreign airport where consignment is taken off the airplane	5 digit proprietary code UNLOCODE	Carrier	Air, Ship

Illustration 1 - Sample aggregation of results of agency survey



## 6.2 Defining and Analysing

This is the responsibility of the data harmonisation project team to conduct the analysis of these elements. The analysis of these six elements revealed a similarity of names (unlading or unloading) were minor variations in the definitions, With regard to “domestic” or “foreign”; the essence of the definition is the location where the goods are removed from the conveyance. It was determined that the terms "unlading" and "unloading" were synonyms. It was determined that the terms "foreign" and "domestic" could be defined by the type of transaction. An export would show a foreign location and an import would show a domestic location.

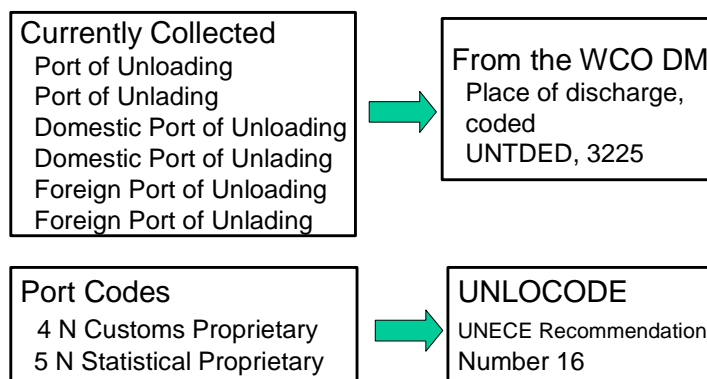
The analysis also revealed that there were three different coded representations of the element, a four-digit code, a five-digit code, and the UNLOCODE<sup>8</sup>.

## 6.3 Reconciling

The first step is to reconcile and to arrive at one name. Given the result of the analysis that unloading and unlading are synonyms, it was determined to use the term "unlading." Since foreign or domestic can be determined by function (export or import transaction) these words could be eliminated. The reconciled name is "port of unlading." After agreeing to the term "port of unlading," this was checked against the international standard of the UNTDED. Port of unlading is not a UNTDED term. The UNTDED term is "place of discharge." The issue of coded representation was resolved by agreement to adopt the international standard of the UNLOCODE.

The following illustration portrays the harmonisation and standardisation detailed above.

### Research/Findings - example



<sup>8</sup> United Nations Location Code



The lead agency data harmonisation team can undertake much of this work taking the WCO data Model as the foundation, but these decisions must be verified and agreed on by the stakeholder participating agencies. Should there be a requirement not available in the WCO Data Model, the WCO Data Model can be amended.

Given the broad range of data requirements it is more efficient to focus these meetings on specific ranges of data element. One such way to establish these focus groups is using the data element categories of the UNTDED. The use of this categorisation can also be included in the spreadsheet to sort the elements.

- Group 1: Documentation references (0001-1699)
- Group 2: Dates, times, periods of time (2000-2799)
- Group 3: Parties, addresses, places, countries (3000-3799)
- Group 4: Clauses, conditions, terms, instructions (4000-4799)
- Group 5: Amounts, charges, percentages (5000-5799)
- Group 6: Measures, identifiers, quantities (other than monetary) (6000-6799)
- Group 7: Goods and articles: descriptions and identifiers (7000-7799)
- Group 8: Transport modes and means, containers (8000-8799)
- Group 9: Other data elements (Customs, etc.) (9000-9799)

Continuing with the example of "place of discharge" a meeting of the agencies interested in Group 3 data elements: Parties, addresses, places, countries (3000-3799) took place. The agencies agreed that the term "place of discharge" and the UN/LOCODE coded representation as expressed in the WCO Data Model would meet their requirements. Accordingly, these six data elements were replaced by one, and two coded representations were replaced by one.

## 7 The size of the standard data set

As governments and their trade communities begin to develop a Single Window environment, there is an understandable concern about the size of the data set. While the data set may be large, the intention is that it will be the maximum set of data that Trade may have to provide. The important message to deliver to Trade is that the entire data set will never be required for any one transaction. This WCO Data Model based standard data set covers all transactions (export, national transit and import), all modes (air, maritime, road and rail), and all requirements of all cross border activities related agencies. It is logically and logistically impossible to require all of the data for any one transaction.



As noted in the example of "place of discharge" as given in these guidelines, the elimination of redundancy and duplication actually resulted in a net reduction. Six elements were reduced to one and three coding schemes were reduced to one.

### **8 Impact on Legacy Systems**

One problem that Single Window developers may encounter is the effect of the use of the international WCO Data Model standards on legacy systems. For example, if a country uses proprietary coding for locations, legacy systems (screening, targeting, accounting, etc.) are based on the proprietary codings. Until there is an overall conversion to the new data element names and codes, countries and traders may have to implement translation capabilities. This translation must convert the new, international WCO Data Model standards and translate these to the WCO Data Model data element names familiar to users and into those codes used in the legacy systems.

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