



WORLD CUSTOMS ORGANIZATION

WCO DATA MODEL

cross-border transactions
on the fast track

Brief introduction

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Foreword

Governments around the world have realized that rapid economic growth cannot be achieved in an environment where international trade processes are inefficient and cumbersome. Over the past two decades, serious attention has been devoted to the modernization of international trade and cross-border regulatory procedures. Countries have committed substantial resources to national projects in the areas of customs automation and Electronic Data Interchange (EDI) infrastructure.

Generally speaking these projects have yielded tangible outcomes, with varying degrees of success in terms of trade data being made available to decision-makers, improved cycle times for cargo and vessels, and greater accountability. Nevertheless, a vast amount of work still remains to be done. Countries vary greatly in the levels they have achieved in this field, and new projects are being taken up. Moreover there are new developments in the area of border regulation, which also create a demand for fresh initiatives.

Electronic 'Single Window' services delivery is now being demanded in several countries. Based on the principle of joined-up government services, the 'Single Window' environment has the potential to deliver transformational advantages to business by simplifying and unifying touch-points between members of the trade and the different government departments involved in cross-border regulatory procedures. In addition, new demands on supply chain security and facilitation have emerged, leading to the establishment of the WCO SAFE Framework of Standards. In the light of these developments, new initiatives are underway, involving the development of new automated systems or substantial upgrades to existing systems.

The emerging business architecture that flows from these developments will face a diverse array of challenges. Project leaders will need to address different possibilities with regard to project scope, business process design, international standards, handling of legacy assets etc. The basic data structures, however, do not vary significantly across contexts as they represent the unvarying truth about the core business. In such a scenario, WCO Data Model Version 3.0 can be very helpful in providing the key elements of the solution.

This booklet provides a brief introduction to WCO Data Model Version 3.0. It explains the scope of the Model, its relationship with other international instruments such as the Revised Kyoto Convention, and its alignment with widely used international standards. The booklet is aimed at project leaders and Information Technology architects from Customs administrations and other cross-border regulatory agencies. The World Customs Organization hopes that this booklet will create a proper understanding of the value of the WCO Data Model as an indispensable instrument in projects that address modernization of regulatory agencies including Customs.

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A.

Background



Over the years, core customs automated systems and Electronic Data Interchange (EDI) facilities have been developed and operated based on national requirements. These requirements arose from national legislation and local operational needs. The need to follow international data standards was also widely recognized. The UN Trade Data Element Directory (UN/TDED) and United Nations' EDI for Administration, Commerce and Transport (UN/EDIFACT) were used extensively in many countries.

Despite the use of these international standards, there were no international data dictionaries in existence for the customs domain. UN/EDIFACT standard electronic messages for customs purposes, e.g., CUSDEC for the import and export goods declaration, CUSCAR for the cargo manifest, etc., did represent an organized approach in this area. Customs administrations contributed to the development of these electronic messages which, over the years, grew into very complex structures. There were no underlying conceptual data models governing the ongoing maintenance of these messages.

The trade and transport community continued to seek simplification of data requirements for international trade transactions, on account of government regulations at the border. It was argued that the global harmonization and simplification of procedures could be achieved by simplifying the underlying data requirements of government agencies.

In 1996 the heads of state and governments of the world's seven largest economies determined that confusing, redundant and non-standard systems of data had become a non-tariff barrier to trade. As a consequence, a group of customs experts was established. The mandate of the G7 customs experts was to standardize and reduce the amount of data necessary to meet customs requirements.

The G7 believed that this standardization and reduction of data would improve the flow of goods across international borders and reduce costs and complexities associated with meeting government requirements. As part of this project, harmonized data sets for the G7 countries were developed for each of the basic customs procedures, with the emphasis on minimizing the data requirements by elimination, simplification and standardization.

The WCO Data Model project is a continuing endeavour towards customs standardization initiated by the G7. The G7 work was taken over by the World Customs Organization (WCO) in 2001, and was known as Version 1.0 of the WCO Customs Data Model.

Through transparent Data Maintenance Request (DMR) procedures, the Data Model content was broadened and deepened in stages, with inputs from a number of WCO Member administrations. The coverage of business processes was enlarged, and more sophisticated modelling techniques (such as UML2) were employed. Electronic messaging guidelines were produced in UN/EDIFACT and XML specifications, based on common underlying syntax-neutral structures derived from the WCO Data Model.

WCO Customs Data Model Version 2.0 was published in 2005. Version 3.0 of the WCO Data Model was released at the end of 2009.

At its June 2009 Sessions, the WCO Council adopted a Recommendation on the use of the WCO Data Model.

A.1

What is new in Version 3 of the WCO Data Model?

One of the main differences between Versions 2 and 3 of the Data Model is that Version 3 specifically includes, for the first time, information required by other cross-border regulatory agencies besides Customs to meet their reporting needs.

Government-to-Business (G2B) messaging is included in Version 3, and greater consideration is given to support for Extensible Mark-up Language (XML) usage.

The Data Model now includes data to specifically support other, or partner cross-border regulatory agency information for agricultural goods, hazardous waste and food safety, for example. A much broader coverage of transit procedures has been introduced. The Convention on Facilitation of International Maritime Traffic and International Ship and Port Facility Security (ISPS) reporting requirements have also been taken into account in Version 3.

WCO Data Model Version 3.0 incorporates the 'Single Window' and the 'cross-border whole-of-government' approach, catering not only for the legal requirements of customs, but also for those of partner cross-border regulatory agencies. Therefore, Version 3 no longer includes the word 'Customs' in its name.

Making the Data Model less customs-centric has introduced the possibility of meeting a much broader range of cross-border regulatory reporting requirements, thus broadening the potential for the use of the WCO Data Model.

Finally, WCO Data Model Version 3.0 includes a Message Implementation Guideline for the new EDIFACT Government Cross-Border Regulatory message (GOVCBR), which was developed by the Data Model Project Team to represent the entire requirements for the "Whole-of-Government Single Window" for cross-border release of goods, containers, and means of transport..

B.

What is the WCO Data Model?



The WCO Data Model is a maximum set of carefully combined and harmonized data requirements derived from cross-border regulation. These requirements are mutually supportive and will be updated on a regular basis to meet the procedural and legal needs of cross-border regulatory agencies such as customs, controlling export, import and transit transactions.

The WCO Data Model is based on the Revised Kyoto Convention which requires customs administrations to request minimal data to ensure compliance with customs laws. Customs administrations will therefore at most require the data elements they have listed for each customs procedure in the respective data sets. These self-imposed limits discourage future increases in data requirements.

The discipline of using the WCO Data Model ensures that any new data requirement for Cross-border Regulatory procedures follows a thorough analysis of the need and decision taking into account international standards. It should also consider the Trade's ability to provide the information in the normal course of its business.

B.1

A harmonized data set

Information and documentation are key elements in the control of international cross-border trade. In today's interconnected electronic environment, controls increasingly include the advance transmission of data to customs as well as Customs-to-Customs information exchange in order to provide the necessary level of security as well as acceptable release times.

Harmonized and standardized data sets and electronic messages incorporating international code standards are key for effective and efficient Business-to-Government (B2G), Government-to-Business (G2B) and Government-to-Government (G2G) exchange and sharing of information.

B.2

Based on Business Process & Information Modelling

Business Process and Information Modelling ensures a proper basis for designing and developing information systems and electronic messages. Business Process Modelling is also key to analysing and optimizing business processes.

The WCO Data Model includes the analysis and modelling of the customs procedures and processes contained in the Revised Kyoto Convention using use-case diagrams and activity diagrams and descriptions. Based upon this analysis, illustrative scenarios for customs business processes are developed.

In the WCO Data Model, information flows from customs as well as from other cross-border regulatory agencies have been categorized and brought together in 'class diagrams' and modelled using the Unified Modeling Language (UML).

B.3

Whole-of-Government Cross-Border Regulatory Approach

Taking on board current Whole-of-Government Cross-Border Single Window developments, the WCO Data Model can:

- Provide all competent control agencies with a common platform for regulatory data exchange thus enabling early sharing of information.
- Offer international traders a simplified interface with customs and multiple government agencies as well as a single access point to carefully focused, fully comprehensive regulatory requirements.
- Enhance risk management with minimum calls on commercial operators, as the critical data needs of all related cross-border regulatory agencies can be met by a single submission to customs using the GOVCBR.
- Enable customs to build up inter-agency operational links and practices that will offset or minimize the operational costs, investments and staff normally associated with border controls.

C.

Why do I need to know about the WCO Data Model?



As the lead resource on procedures and the main business interface for IT staff, why do I need to know about the WCO Data Model?

C.1

It helps create the blueprint for a modern customs system

The WCO Data Model, as a conceptual data model for customs business and cross-border regulation, helps establish the blueprint for a modern information system. Along with generic use cases and activity diagrams, the standard electronic messages define, at a very high level, the system data inputs and outputs.

These artifacts constitute high-level specifications for customs business. While real automated systems are built based on specifications derived from national legislation and local operational needs, software applications for customs and cross-border regulatory agencies should as far as possible be based on international standards.

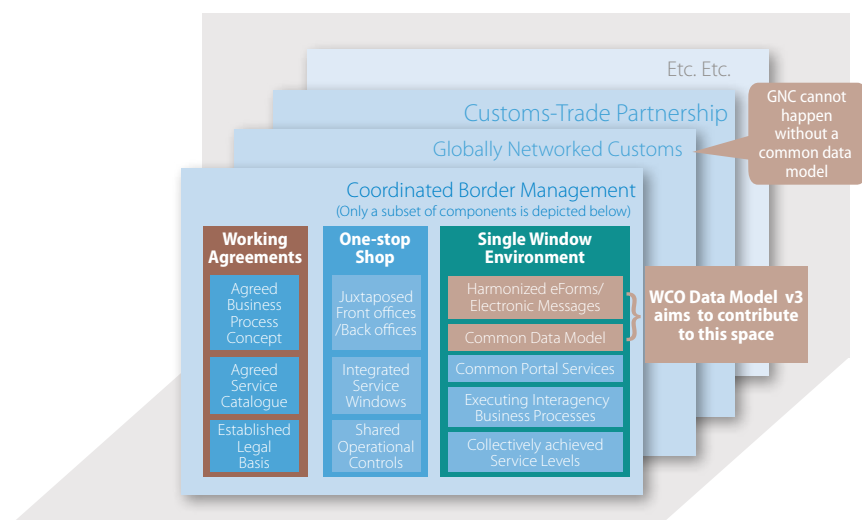
The WCO Data Model was developed on the basis of a detailed exploration of data-oriented structures pertinent to customs and border regulations. This was accomplished through a formal process of defining and describing data elements and their inter-relationships. These data elements were tabulated according to business processes that used them. Abstractions for representing and accessing the data were developed and described through a range of models assembled using the Unified Modeling Language (UML). These UML class models include an overall model and others that are specific to different customs procedures. These were then exploited for the production of industry-strength UN/EDIFACT and XML messaging guidelines.

WCO Data Model Version 3 is neutral as regards the type of automated information system that runs it. It can be implemented on any kind of computer hardware or software platform and is technique-independent.

C.2

It is the core of the Cross-Border Regulatory Single Window

A major aspect of modern customs forward thinking is the notion of Co-ordinated Border Management (CBM), and within that concept the Whole-of-Government Cross-Border Single Window is a key enabler.



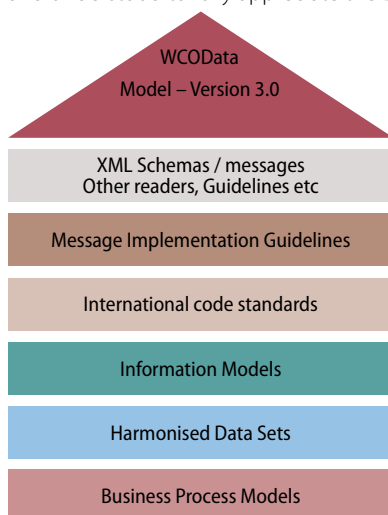
WCO Data Model Version 3.0 is the solution for optimized electronic data exchange, providing a global standard for whole-of-government cross-border data requirements for the release and clearance of goods; the result is a saving on costs and time for governments and for the trade community.

It promotes the concept of 'single submission' of data – or one piece of information to be submitted only once to the cross-border regulatory agencies. The objective should be to obtain and use such data from the parties that are in the best position to provide it. The data should be obtained at the earliest point in time in the supply chain. The WCO Data Model positions itself as the universal language for cross-border regulatory data exchange.

C.3

It is a complete toolbox

The WCO Data Model is a toolbox containing material that can be used for a variety of purposes. As shown in this diagram, the WCO Data Model consists of several components. These components serve to make it clear that the Data Model is not a single monolithic entity, rather it is a complex interrelated set of discrete components. Each component needs to be analysed and understood to fully appreciate the Data Model.



At one level, the WCO Data Model is a comprehensive dictionary of data required to exchange and support customs processes and regulatory information needed for several partner cross-border regulatory agencies. This data dictionary is organized as the data set for Export, Import, Transit, Conveyance and Response.

With a view to reducing and rationalizing the data requirements of different procedures, the WCO Data Model is the basis for an agreed maximum data set.

At another level it is a technical model, systematically developed to reflect the relationships between the different pieces of information. These technical models are stepping stones to the development of data structures for the real business.

As mentioned earlier in this brochure, the WCO Data Model includes analysis and modelling of the customs procedures and processes contained in the Revised Kyoto Convention using use-case diagrams and activity diagrams and descriptions. Based upon this analysis, illustrative scenarios for customs business processes are developed.

Information flows from customs, as well as from other cross-border regulatory agencies, have been categorized and brought together in superclasses and class diagrams, and modelled using UML. These models can be used at national level as reference models during the development of automated systems. Normally, similar models are developed to establish the architectural design of automated systems.

The models help business analysts to understand and discover relationships between data coming from different processes in the international supply chain. The WCO Data Model helps database designers to discover and identify those relationships that must be reflected in the databases.

Lastly, the WCO Data Model contains standardized electronic messages along with detailed implementation guidelines and other supporting documentation.

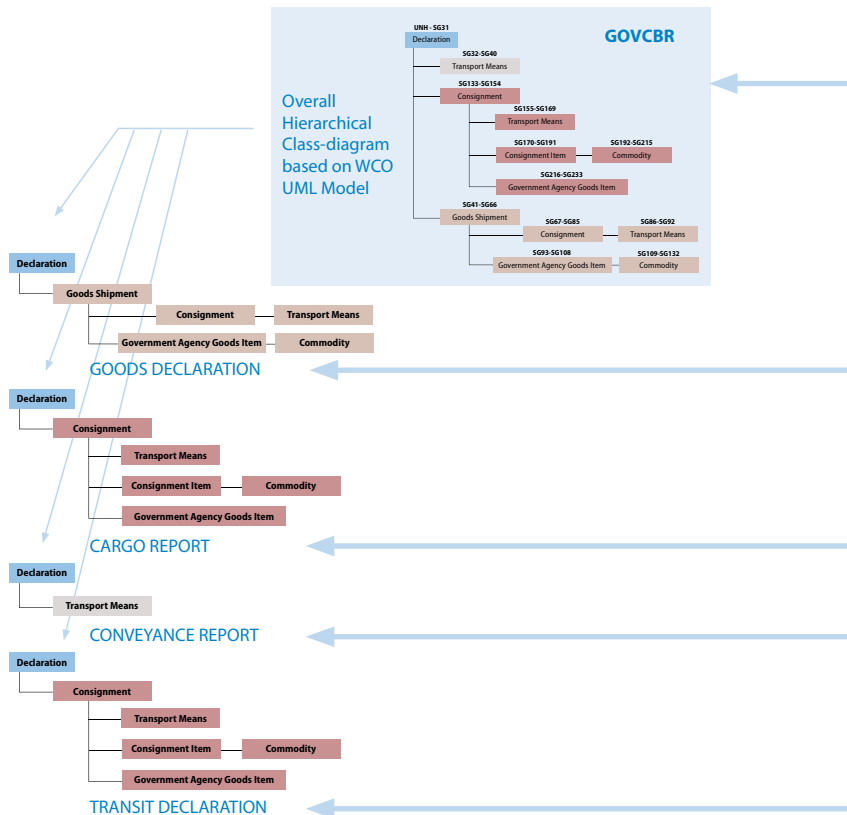
C.4

It is the basis for GOVCBR

The new UN/EDIFACT message called GOVCBR, or Government Cross-Border Regulatory message, brings together all the data needed for customs and cross-border regulatory agencies;

- It provides the totality of data requirements, giving implementers flexibility to design electronic messages to suit different business needs related to legal requirements for cross-border transactions.
- It makes it possible to implement the concept of single submission (a piece of information will be submitted once within one transaction).

- It covers messages for export, conveyance, cargo, import and transit reporting, as well as response messages from a cross-border regulatory agency.
- Application developers using GOVCBR will have to maintain mapping of just one message-type in stead of multiple message-types, such as CUSDEC, CUSCAR, etc.
- GOVCBR also caters for the exchange of information, nationally and internationally, between regulatory agencies.



SEVERAL OTHER MESSAGE TYPES ARE POSSIBLE!!

Cross-border regulatory agencies have specified business forms in their regulations. These forms need to be completed and submitted by traders, for all transactions that must satisfy these regulatory requirements. A Single Window implementation looks at these requirements from a holistic perspective and suggests designs for rationalized forms and the organization of a harmonized set of requirements. Such re-organization is driven by the principle that each piece of information is submitted only once within one transaction. The WCO Data Model provides a clear basis for a Regulatory Message in which such an arrangement is facilitated, and GOVCBR is the structure that carries this message.

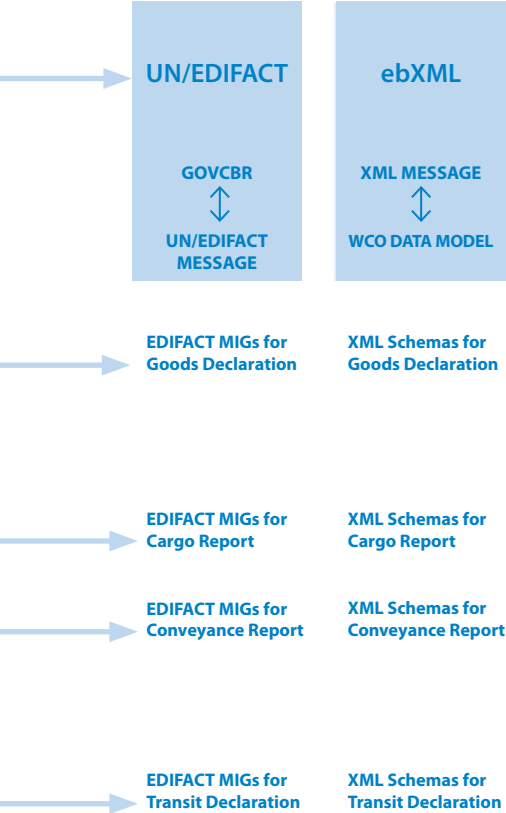


Figure: Relationship between WCO UML models and messages

C.5

It comes with XML specifications

XML specifications and guidelines help implement the XML variant of the GOVCBR and other XML messages for cargo reporting, goods declarations etc.

- XML Schemas and XML Message Implementation Guidelines provide documentation that can help build XML message instances that are consistent with the Data Model.
- Re-usable components of XML Schemas include documentation from the WCO Data Model, which can be used for validation purposes. This is aimed at simplifying message processing by promoting re-use of schema components.

C.6

It facilitates regulatory data harmonization

Data used by customs administrations and border regulatory agencies originates from different parts of the world in the course of trade and transport transactions. In an international transaction, the same data is used in different systems across the world, from one end of the supply chain to the other.

This includes data about goods being traded, parties involved, documents required, means of transport and transport equipment, as well as locations and times of significant events that take place along the supply chain. Over the years, systems developed in this field have always strived to minimize, if not completely eliminate, the re-keying of data.

Information and documentation are key elements in the control of international cross-border transactions. In today's interconnected electronic environment these controls increasingly include advance transmission of data to Customs. In order to provide the necessary level of security as well as acceptable release times, possibilities are foreseen for Customs-to-Customs (G2G) information exchange.

Advance transmission implies the submission of data before the arrival of goods or, in some cases, before goods are placed in the container that will carry them. For reliable and accurate advance information, it is essential to use international standards.

The Data Model Project Team developed guidelines to support Single Window Data Harmonization.

C.7

It explains the use of international standards for codes

International code standards enable communication to take place where ordinary spoken or written language is difficult or impossible. The alternative to using coded information is free text, which opens possibilities for errors.

Codes represent data in a way which is more resistant to errors in transmission or storage, or allows the same information to be sent with fewer characters, more quickly and less expensively. In order to ensure that information keeps the same content during its transmission and transfer into databases, it is necessary to agree on common codes between sender and receiver.

Systems that do not use codes will not be able to provide accurate data for their business processes. This is because free text data is susceptible to minor typographical errors, making it unsuitable for developing computerized routines. For instance, risk profiles cannot be developed easily for business entities, commodities or logistics locations that are not represented by codes.

WCO Data Model Version 3.0 provides comprehensive information about how to obtain these codes and handle them in databases, not just for customs but also for a variety of other government agencies.

C.8

It was developed with Trade's involvement

The WCO Data Model has not been developed in isolation. Participants from the Trade and Transport community and from other cross-border regulatory agencies have assisted with the development of Version 3. Simplifying cross-border regulation will result in reduced costs and lower cycle times. This is the reason why Trade has contributed enthusiastically to the WCO Data Model.

Trade and Transport organizations as well as partner cross-border regulatory agencies will remain involved in the future management and maintenance of the WCO Data Model.

Interested parties from the business community are encouraged to join with representatives of participating administrations in reviewing the WCO Data Model, in order to improve subsequent versions where possible.

D.

Relationship with other international instruments

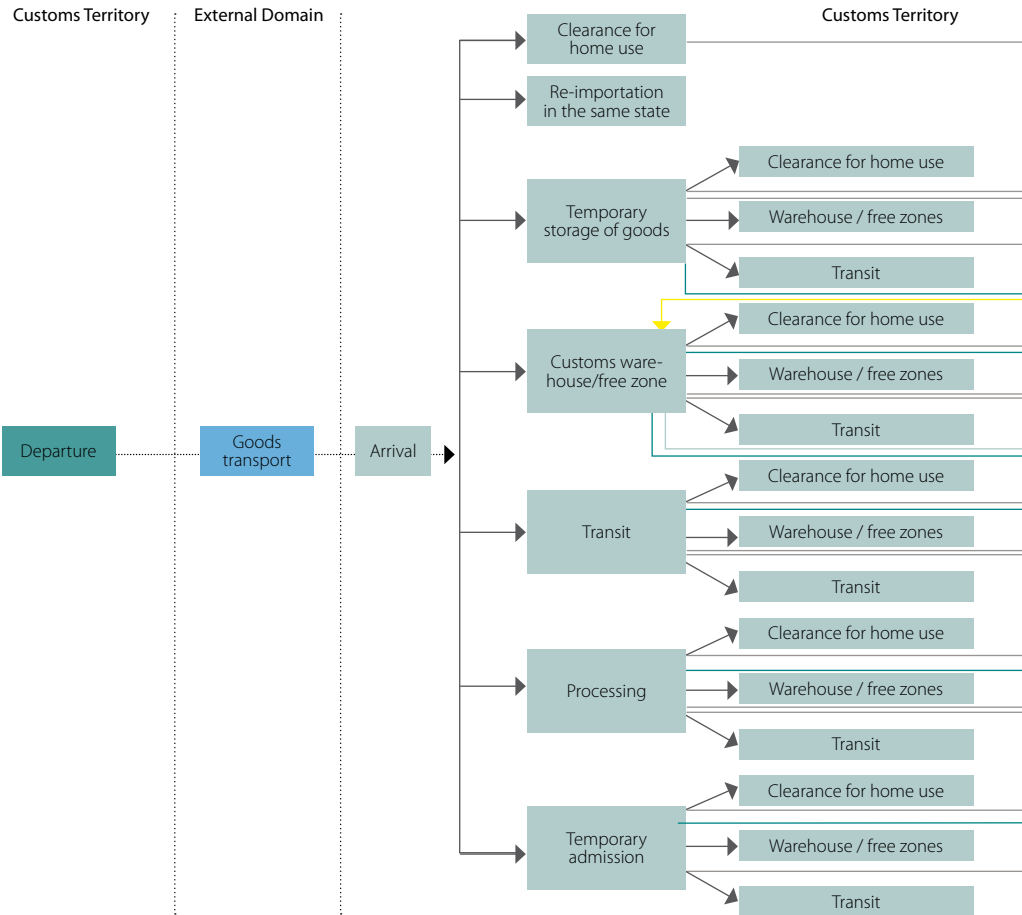


How does WCO Data Model Version 3.0 relate to other international instruments governing trade & transport?

D.1

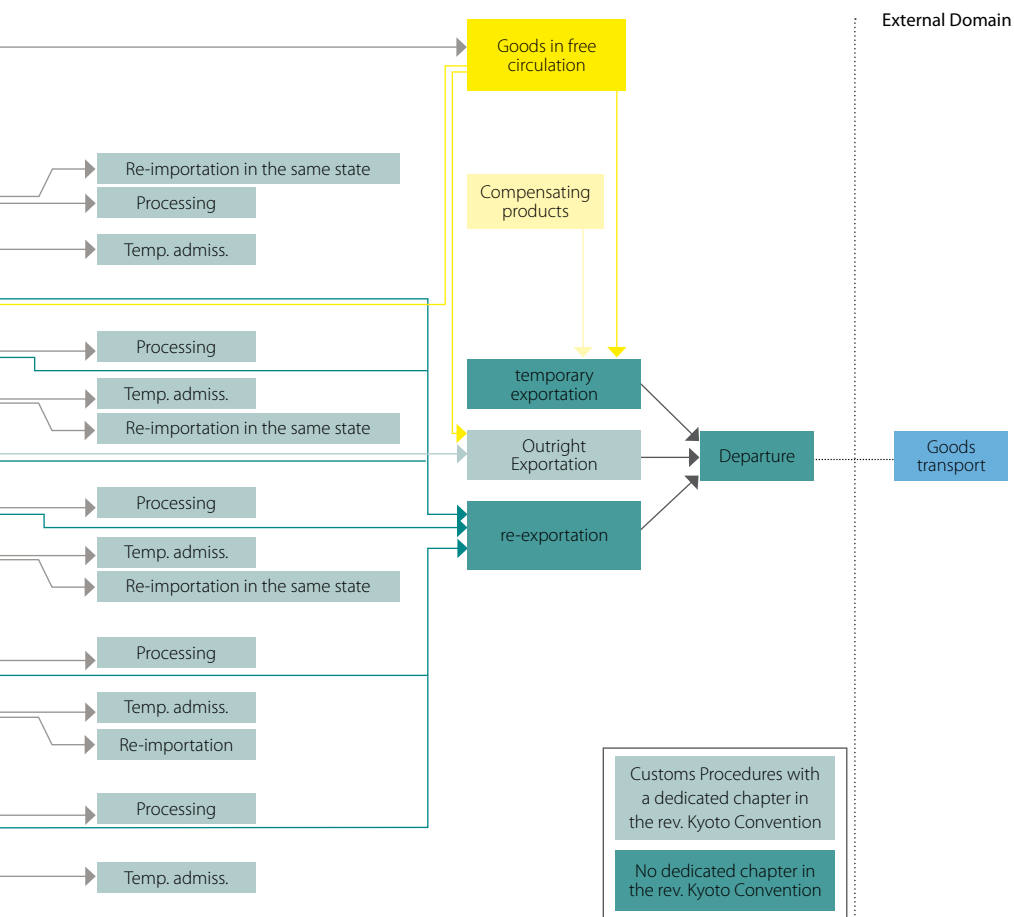
Revised Kyoto Convention

The Revised Kyoto Convention provides the basis for listing out customs procedures for the WCO Data Model. This diagram shows the customs procedures as described in the revised Kyoto Convention and its Guidelines.



The diagram shows the different possibilities for customs procedures to occur in sequence. When a conveyance arrives in the customs territory, goods have to be placed under a customs procedure. This may be followed by those goods being placed under another customs procedure before they are released and cleared for free circulation.

Documentation in the WCO Data Model provides an understanding about business processes that are associated with some of the main customs procedures. The WCO Data Model considers data requirements in the light of a background knowledge of all customs procedures.



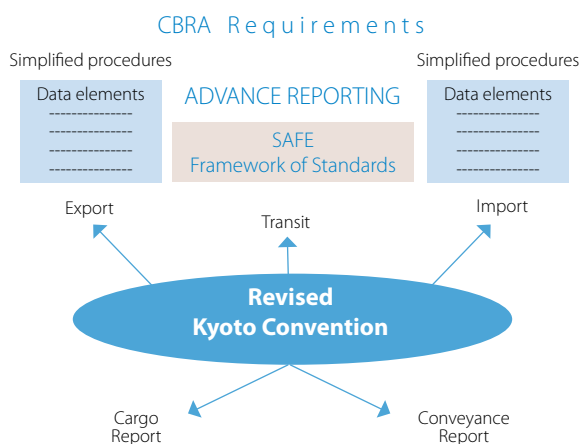
D.2

SAFE Framework of Standards

The role of customs has undergone a transformation over the years. Even where countries are compelled to remain focused on revenue mobilization, supply chain security initiatives and public health and safety regulations have become extremely important.

WCO developed the SAFE Framework of Standards (SAFE FOS). The desire to secure and facilitate trade is demonstrated by the commitment and willingness shown by WCO Members to implement this Framework of Standards.

The SAFE Framework of Standards includes advance reporting. The WCO Data Model takes into account this requirement and contains structures that can be used for advance electronic reporting under SAFE FOS.



Using WCO Data Model Version 3.0, electronic messages can be created to enable end-to-end container tracking. For example under the United States Safe Ports Act, importers and carriers are obliged to file what are popularly referred to as '10+2' requirements. These requirements have been mapped to the WCO Data Model Version 3.0.

D.3

IMO FAL & SOLAS Conventions

The International Maritime Organization (IMO) is responsible, *inter alia*, for determining international obligations in respect of marine safety. This includes documentation pertaining to the certification of seafarers, vessels & safe operation of vessels. Reporting requirements arise out of these obligations, including cargo and security reporting.

Security and safety in the maritime world are governed through the Safety of Life at Sea (SOLAS) Convention. In recent years this Convention has been amended to strengthen the security of vessels and port facilities through the International Ship and Port Facility Security Code (ISPS Code).

IMO FAL Convention governs the reporting aspects of the Ship/Port interface by the use of FAL forms (1 to 7) providing the global basis for declarations for cargo, conveyance, bunker fuel, ship's stores, etc.

WCO Data Model Version 3.0 takes into account the requirements of security and ship reporting under the FAL and SOLAS Conventions and ISPS.

D.4

Other international conventions

Convention on International Civil Aviation

The International Civil Aviation Organization (ICAO) creates standards for international air navigation. Annex 9 to the Chicago Convention contains several provisions dealing with the Standards and Recommended Practices (SARPs) on Facilitation (FAL) relating to, *inter alia*, customs and immigration procedures, including standards for electronic reporting of aircraft, their cargo, passengers and crew. It also manages a number of code lists concerning air transport. Airline declarations for cargo based on ICAO Convention requirements are fully covered by the WCO Data Model.

WTO Valuation Rules

The WTO Agreement on Customs Valuation establishes a system for the valuation of goods for customs purposes.

This system requires certain data concerning a transaction, in order that automated systems can correctly apply the principles enshrined in the WTO Valuation rules.

The WCO Data Model aims to accurately capture and organize this data as part of the import and export declaration.

HS Convention (International Convention on the Harmonized Commodity Description and Coding System, 1983) (Customs Co-operation Council)

In terms of the objectives of this Convention, the WCO Data Model recommends the adoption of the HS code for the collection, comparison and analysis of trade statistics; these activities are facilitated by reducing the expense incurred in redescribing, reclassifying and recoding goods from one classification to another.

However, where other cross-border regulatory agencies require other classification schemes to operate in their specific area of decision-making, the WCO Data Model makes it possible to report classifications according to those schemes.

TIR Convention (Customs Convention on the International Transport of Goods under cover of TIR Carnets, 1975) (UN/ECE)

The TIR Convention applies to the transport of goods in road vehicles, including containerized cargo that moves across one or more frontiers. The WCO Data Model has been aligned with the 'electronic TIR' requirements.

The Transit section of WCO Data Model Version 3.0 comprehensively covers 'eTIR' specifications.

Rules regarding Dangerous Goods

The WCO Data Model promotes the use of international standards laid down in or derived from the Recommendations of the Committee of Experts on the Transport of Dangerous Goods of the United Nations Economic and Social Council (UN/ECE)

However, where national regulations require additional classification regarding naming, documentation, labeling or packing, the WCO Data Model enables the delivery of such additional information required by the relevant national regulatory or handling agencies.

Other international conventions

WCO Members, as well as representatives of international organizations brought in cross-border regulatory requirements based on international conventions, agreements and projects such as the International Convention on Plant Protection, the Basel Convention on Hazardous Waste, the Wassenaar Arrangement, the e-Cert project, etc.

E.

What about other international data standards?



The WCO Data Model is consistent with other international standards such as the United Nations Trade Data Elements Directory (UNTD ED), and will be aligned with UN/CEFACT's Core Component Library (CCL).

E.1

UN CEFACT Standards

ebXML and UN/CEFACT Core Component Library

Also included in the WCO Data Model are recommendations for the development of XML messages. ebXML, as the only widely accepted XML standard, was recommended by the WCO Data Model Project Team as the standard for developing the WCO XML specifications.

- ebXML is a modular suite of specifications that enables enterprises to conduct business on the internet. It also describes how XML technologies can be used for creating and exchanging messages. ebXML is considered to be more affordable than traditional EDI solutions.
- With regard to the business content of electronic messages in XML format, ebXML is backed by UN/CEFACT, the global body standardizing ebXML message content specifications. ebXML works on the core components of messages and business process models.
- The WCO participates in the UN/CEFACT standardization processes for core components. The WCO Data Model is being aligned with, and incorporated in the UN/CEFACT Core Component Library.

UN/ CEFACT Recommendations

The WCO Data Model recommends the use of UN/CEFACT Recommendations such as:

- Rec. No.3 Use of ISO Country code - code for representation of names of countries
- Rec. No.5 Abbreviations of INCOTERMS

- Rec. No.9 Alphabetic code for the representation of currencies
- Rec. No.16 LOCODE - Code for ports and other locations
- Rec. No.17 PAYTERMS - Abbreviations for terms of payment
- Rec. No.19 Code for Modes of Transport
- Rec. No.20 Code for Units of Measurement used in international trade
- Rec. No.21 Codes for types of cargo, packages and packaging materials

UN/ EDIFACT Messaging Standards

Previous versions of the WCO Data Model catered for UN/EDIFACT standard-based messages such as CUSCAR (Customs cargo report message), CUSDEC (Customs declaration message) and CUSREP (Customs conveyance report message). WCO Data Model Version 3 has been developed to be the kernel of a Whole-of-Government Cross- Border Single Window. The GOVCBR as developed from Version 3, will eventually make the CUSXXX messages superfluous.

GOVCBR makes it feasible to comply with the key element of a Single Window, namely to send a piece of information only once within one cross-border transaction. GOVCBR allows regulatory agencies to create and specify electronic messages from the same structure to any cross-border situation involving the release of goods, containers or conveyances.

For the use of the GOVCBR message, Message Implementation Guidelines (MIGs) form part of the WCO Data Model. Using these guidelines, customs administrations can implement import and export declarations, cargo and conveyance reports, transit declarations and response messages. In a Single Window environment, each message can carry information needed by partner cross-border regulatory agencies also.

UN/EDIFACT works with the help of internationally agreed structures or building blocks of messages. During the development process for WCO Data Model Version 3.0, the Project Team developed around 450 new codes and these were submitted to the UN/EDIFACT Board for inclusion in the standard code lists.

E.2

ISO Standards

Several International Standards Organization (ISO) standards have been recommended for use in WCO Data Model Version 3.0.

They include: Country code (ISO 3166), Currency code (ISO 4217), Dates, times, periods of time (ISO 8601), Trade Data Elements (UNTDED - ISO 7372).

F.

What problems will the WCO Data Model help solve?



Project managers for a large customs or Single Window system often face questions in regard to the precise definition of the scope of the project. Any such system is usually built to serve for a 7-12 year time-period.

On the one hand, the scope of the system has to be clearly circumscribed in order to cover all the functionalities currently required, so that stakeholders can understand its implications for project resources and project outcomes. On the other hand, the scope must be broad enough to deliver an architectural blueprint that can accommodate future enhancements over the long term, without necessitating too many changes.

To overcome these concerns, solution providers have advocated different architectural approaches. The software architecture provides a way to define what software components would be built, and how these components could be scaled up to meet future requirements. Software runs on data, which represents the 'unvarying truth' about a business. The kind of data a particular type of business will require depends to a very large extent on the nature of the business, and to a limited extent on the business processes employed or the geography they are employed in.

The WCO Data Model is a comprehensive collection of data requirements from the cross-border regulatory domain. It provides the blueprint for data that will run on any kind of system in this domain. Establishing the correct architectural blueprint for data early on in a project leads to a more holistic design of data objects, including databases, that meet the information needs of all the cross-border regulatory agencies which are partners in the project.

The WCO Data Model relies on the high-level business processes described in the Revised Kyoto Convention. These business processes underpin a number of customs procedures. The WCO Data Model also takes into account the needs of several cross-border regulatory agencies.

In order to ensure that the architectural solution will be comprehensive and scalable, it is necessary to start a project with a complete set of data requirements, a complete list of business processes, customs procedures and relevant cross-border regulatory agencies' requirements.

F.1

Implementing Single Window Business Processes

Government departments are entrusted with the responsibility for enforcing regulations at the border. Each department has prescribed its own forms, which require Trade to submit information at different stages.

Duplicate submission of information occurs when cross-border regulatory agencies do not share with each other information received in the course of trade or transportation events. For example, to apply for a license, a trader is required to provide information about the product, the importing parties and supplying parties etc. This information is repeated in customs declarations for import or export.

Duplicate submission of information, which carries a risk of errors, can be avoided by building systems requirements that acknowledge these redundancies. The data harmonization methodology provided as part of the WCO Data Model documentation helps identify these redundant pieces of information and alert business analysts to the possibilities of simplification.

The GOVCBR message structure provides a methodology for devising different electronic messages based on the same underlying structure to be used at different stages of cross-border trade & transport flows. Different cross-border regulatory agencies can work with the superset of information that GOVCBR represents. In this way these agencies can organize their business processes to cause minimum inconvenience to Trade and yet execute all regulatory procedures.

Overlaps in the information submitted are sometimes unavoidable, but should be kept to a minimum. Any overlap should either be used to retrieve linked-up information, or for a deliberately designed double-check.

The chart below shows the possible business processes that the WCO Data Model Version 3.0 can serve.

GOVCBR STRUCTURE PROVIDES NUMEROUS POSSIBILITIES	
1	Designed as part of WCO DM Version 3 Goods Declaration for Imports & Exports Transit Declarations Two step goods Declaration for Imports & Exports (simplified procedures) Cargo Reports for Imports & Exports Conveyance Reports Government Response to above declarations/ Reports
2	Mapped to WCO DM Version 3 Advance Export Goods declarations (SAFE) Advance Cargo Declarations (SAFE)
3	Other messages providing security & logistics information Container Status Tracking (For Logistics & Security) Monitoring & Control of Vessel Movements Transport means security reporting
4	Out of scope of Version 3 but may be catered for Requesting regulatory requirement details Quota registration and utilization Application for License Permit, Certificate or Authorisation License utilization reports
5	Other messages based on the WCO Data Model (not on GOVCBR) Messages for maintaining codelists and Identifier master data Requesting tax computation & tax regimes details Duty tax fee payable & payment confirmation messages Long-term trade contracts registration – example project imports Advance ruling applications for commodity classification or valuation or origin

F.2

Complex requirements of partner cross-border regulatory agencies

Different government departments responsible for specific regulations and/or the control of different commodity/product groups often require different attributes of the traded goods to be reported. The product characteristics that are of interest to the agriculture department may be different from those for the mines & minerals and food safety departments.

WCO Data Model Version 3.0 has a precise solution for all such situations. The data structure pertaining to Commodity is very elaborate, and can accommodate extremely complex requirements of customs and other government departments.

These data structures help in implementing complex types of fiscal and regulatory policies on commodities. Such restrictions may not be based on the HS code alone but on other classification schemes, identification schemes or even characteristics of the commodity. These structures can help define and collect statistical data in order to meet the most complex demands of other government agencies.

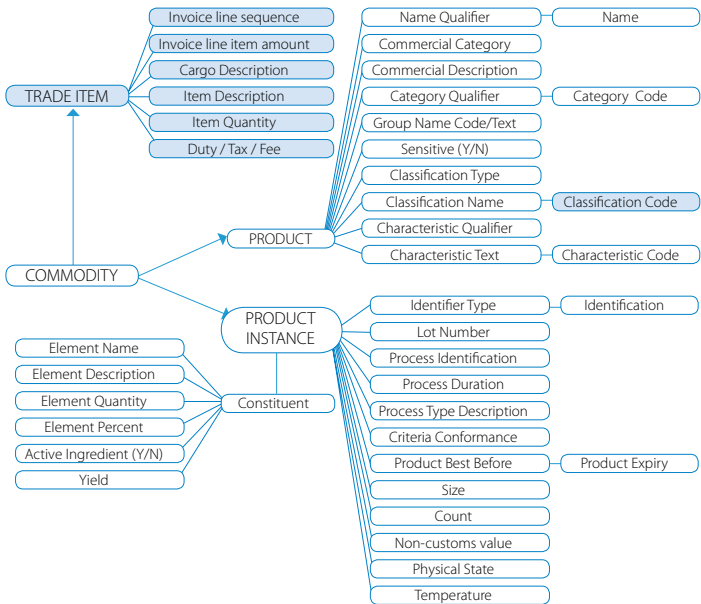


Figure: Commodity details in the WCO Data Model

The above diagram shows the complexity of data requirements that may be specified by cross-border regulatory agencies in regard to a commodity. The details that are normally available in invoices are highlighted in light-blue. Cross-border regulatory agencies may require other information, which may vary depending upon the commodity being traded.

For example, in the case of an automobile, the focus for the transportation department may be on the emission and fuel efficiency considerations, where Commodity Characteristics qualifiers and Commodity Characteristics Text or Code can be used to specify detailed information (e.g. engine type, fuel type, fitment of a catalytic converter, emission norm certification, fuel efficiency certification, driving side etc). A country that runs a special program to encourage environment friendly automobile imports may like to have data very specific to these characteristics that impact tax treatment. In such a situation, the WCO Data Model would be of immense value in facilitating automated clearance.

As another example, in regard to food safety, it is possible to use the attributes such as 'Product expiry date', Best Before date, Brand name, 'fanciful name' (using commodity name qualifier and commodity name, percentage alcohol (constituent element name & element percent) to determine compliance with food safety regulation.

F.3

Quality of data for effective risk management systems

Very often, the failure of risk management solutions can be attributed to poor data quality. Improvement of data quality begins with the adoption of widely accepted international data standards. The use of coded data as opposed to non-coded data represents a big step towards improving data quality.

The documentation on the WCO Data Model provides information about the possible use of codes for every data element that can be codified. It also provides ideas that help reduce the re-keying of data, thereby reducing the opportunity for errors to creep in. The accuracy of data improves the effectiveness of targeting.

When dealing with high-risk areas, customs administrations would like to obtain more precise data in the declarations, but do not have the scope within existing forms and messages to capture such data. The aggregation of data required by partner cross-border regulatory agencies may result in improved targeting for all the authorized parties concerned. The WCO Data Model can help optimize these requirements and enhance targeting capability.

Needless to say, the combination of advance reporting as referred to in sections B2, C4 and D2 above, and good data quality will give any risk management system the wherewithal to operate very efficiently. This of course allows cross-border regulatory agencies to “do their homework” before the actual consignment arrives. The exchange of information between regulatory agencies as referred to earlier in this brochure will lead to co-ordinated actions.

F.4

Complex schemes for duties, taxes & fees

There is a need for software applications that accurately compute duties, taxes and fees by type, by correctly applying different regimes to each of these duties/taxes/fees. Each one – and there can be a fairly complex array of duties, taxes and fees - must be correctly computed in strict accordance with the method prescribed in the legal text that authorizes its imposition.

Certain commodities have very complex duty and tax structures (alcohol/spirits and motor vehicles are usually cited as examples). These are based on intricate pieces of legislation that are not always drafted in such a way as to make life easy for the programmers!

Tax structures may be based on product characteristics that go beyond the specificity provided for by the HS tariff classification code. Also, it is often difficult to make the declaration reflect that the regime claimed is correct in respect of the commodity.

The WCO Data Model has a structure for a goods declaration that can help solve these kind of problems.

G.

Implementing WCO Data Model Version 3.0



The WCO Data Model will probably be implemented at the national level in a cross-border Single Window environment. It can also be implemented without Single Window considerations. Greater benefits will be derived from the WCO Data Model if implementation takes into account scenarios involving bilateral or multilateral data exchange. Implementation should take place only after close consultation with Trade.

What is often forgotten is that the Data Model can also be used by application software developers who provide software solutions to the trade and transport sectors. After all, the data that customs need is provided by the businesses that engage in international trade and transport activities. It is recognized that implementation will happen over a period of time requiring flexibility from all parties.

G.1

In the context of a new project

A new software project for the development of a Single Window environment or a core application for customs automation is ideally positioned to fully implement the WCO Data Model. The WCO Data Model documentation is of immense value to such projects.

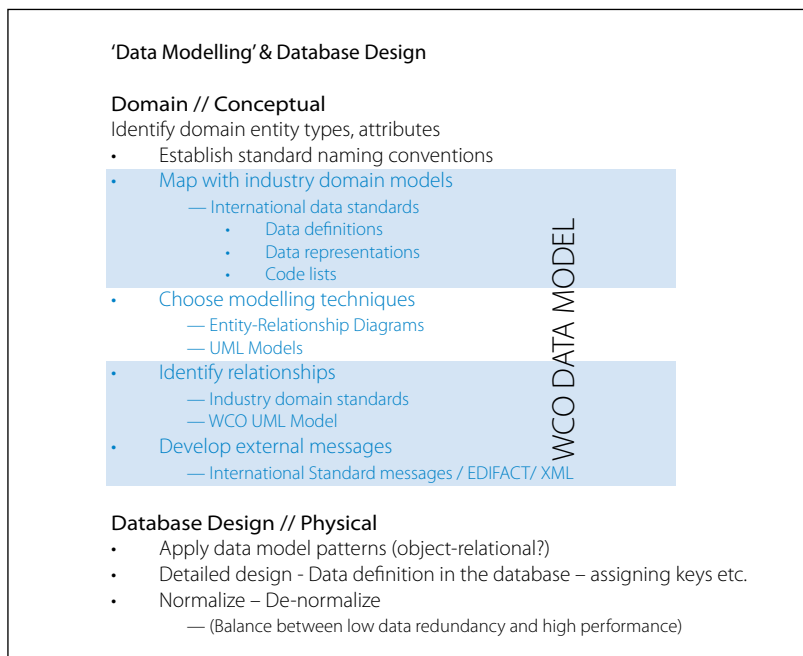
To build an automated system, the software developer requires detailed specifications. While such specifications will have to conform to national legislation and regulatory requirements, this is also an opportunity to conduct a detailed examination of international standards that can be taken on board. Most frequently, it is not the legal requirements but local practices and conventions that stand in the way of the adoption of international standards.

Large systems of this kind are usually built to last 7 to 12 years. Therefore, these systems must be built on the basis of a blueprint that covers the widest requirements. The WCO Data Model is based on many years' collective experience of several Member administrations, plus input from partner cross-border regulatory agencies. The Data Model contains the essential ingredients that add up to a set of comprehensive specifications.

In particular, a new project can benefit from:

- the comprehensive list of customs procedures, essentially flowing from the Revised Kyoto Convention.

- the coverage of requirements arising out of international conventions related to cross-border reporting.
- data structures that help carry the most intricate pieces of information that any government agency might conceivably need, regarding cargo, goods, means of transport and their crew.
- the GOVCBR structure that helps define messages in a flexible manner for use in a whole-of-government cross-border Single Window environment.
- the collection of internationally used code lists that greatly facilitate data transmission and data use.
- UML models that describe the intricate relationships between data. These relationships provide input for building sustainable operational databases. The illustration below shows the relationship between a conceptual data model and physical database design.



G.2

To help improve an existing system

Generally, customs administrations are using systems that are based to some extent on international data standards. Every administration faces requests for the incorporation of new business requirements. To manage these change requests, a formal change-control procedure is recommended. Sometimes, change requests present opportunities to implant modifications that make the software application compliant with the WCO Data Model.

If an administration is planning substantial enhancements to its current software, this may be an opportunity to make the application achieve compliance with the WCO Data Model.

Sometimes, however, the current software application may not be able to accommodate these changes. Even where they are considered feasible, there are usually high risks and costs associated with such changes that are large and complex. Estimations of the time and effort required to implement new change requests are usually incorrect and complicated. In such situations, the development of a completely new software application may be worth considering.

G.3

How to use the WCO Data Model?

In the case of a new project, or where a substantial software upgrade is envisaged, certain activities may be undertaken. (In this regard please refer to the WCO Single Window & Data Harmonization Guidelines - http://www.wcoomd.org/files/6.SW_files/Data_Harmonisation.pdf)

A national database should be developed, comprising the following:

- A high-level reference model of business processes associated with the cross-border regulation of goods, means of transport, crew and transport equipment.
- National regulations, laws & codes that govern the cross-border movement of goods, means of transport, crew and transport equipment.
- List of government agencies interested in border regulation.

- Cross-border regulatory forms along with the associated business processes.
- Regulatory data in electronic messages.
- Code lists that are in use for all these forms.
- Data elements used in procedures and administrative data. These should be checked from the operational databases.
- Production of mapping between these data elements and the WCO Data Model, UNTDED & UN/CEFACT - Core Component Library (CCL).
- Use of WCO Data Model definitions, representations and code lists in national implementation.
- Use of the WCO's EDIFACT and XML Message Implementation Guidelines
- Use of extensions to the WCO Data Model, if this is absolutely unavoidable. Submit data maintenance requests to the WCO Data Model Project Team at the earliest opportunity.

G.4

Who should be concerned with the national data harmonization process?

Experts on regulatory procedures

- Responsible for prescribing regulatory forms for trade and taxation
- Who ensure that procedures conform to domestic legislation & international conventions

Business analysts

- Who examine data objects (holders of data) and the way these objects work with the business rules that govern the use of the data
- Concerned with the data required for each process

Business intelligence specialists

- Interested in corporate metadata
- Who understand what is needed for building high-quality risk profiles

Database architects/ designers

- Dealing with the Conceptual Data Model which is the basis for Physical database implementations
- Involved in a model-driven software development programme

EDI and XML specialists

- Involved in the development and implementation of electronic messages

G.5

What about the maintenance of the WCO Data Model?

WCO Member administrations have agreed that changes to the WCO Data Model will have to follow strict control procedures. Data elements, for example, will be added only if it is determined that the requested element is critical to the needs of the requesting country and that the information cannot be derived from an existing data element in the Data Model. Changes and additions should be required by at least two Members.

New versions of the WCO Data Model will be issued every five years. The next version, Version 4.0, is scheduled for the end of 2014. In the meantime, Service Packs will be issued to ensure that known errors are rectified and incorporate new requirements based on changes to legislation, security requirements etc. In order to have these requirements incorporated in the Data Model, the afore-mentioned procedure will be followed.

Where to obtain more details

More information on the WCO Customs Data Model, and access to national and regional contact points, are available on the WCO web site: <http://www.wcoomd.org/sw.htm>

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