DocNo: TBG2-2006-28-0-Application Guideline

UNeDocs Application and Implementation Guide

[ver 2.3, 26.10.2006]

1.   Objectives

This document presents guidelines for UNeDocs Project Teams during the development and implementation of a UNeDocs Project. It details the steps required for successful implementation and will be updated as and when these best practices are further refined.

2.   Summary

The recommended steps include:

Step 1   Project Setup
Step 2   Collation of required artefacts
Step 3   Data Harmonisation - the Collation and Analysis of required Data
Step 4   Modelling Stage- Review of UNeDocs data model against identified data requirements
Step 5   Documentation of UNeDocs Data Model change requests (if required)
Step 6   Development of CCTS document structures (message assemblies)
Step 7   Publication
Step 8   Verification
Step 9   Implementation
Step 9   Maintenance

3.   Background: The UNeDocs Data Model

The UNeDocs Data Model encompasses the data requirements for the entire transaction process of cross-border trade, in particular the trade, transport, finance and Business-to-Government (B2G) processes. UNeDocs is currently being developed under UN/CEFACT and will form the basis of the next generation of standards for international trade documents, both in paper and in electronic format. It integrates the established paper-based standards for aligned trade forms, in particular the UN Layout Key, with the requirements of paperless trade. It provides a detailed document data model of the information structure in an abstract, syntax neutral format, based on the UNTDED and the UN/CEFACT Core Components Library.

This Data Model ensures a built-in alignment of import and export documents and information. The traders and administrations can exchange information based on the harmonized data structures of the Data Model. The Data Model reduces, or removes, redundancy and the use of synonymous terms in different areas of application. These areas might be geo-political (countries or regions) or business related. So the Data Model forms a controlled and harmonized vocabulary of business terms related to trade procedures worldwide.

It also helps to integrate various forms of information submission. Since it is not bound to a specific syntax it can be applied to any existing or emerging technologies (including UN/EDIFACT or XML) to generate an electronic message, or to print a paper document or to render an electronic document.

UNeDocs uses the concept of a generic master document that was first established for aligning paper-based trade documents (UN/CEFACT Recommendation 1). Under this concept, filling in the master document can generate a whole series of trade documents with a single submission of data. UNeDocs extends this concept by providing a Master Data Model for the master document. Every specific document Data Model, (e.g. the Invoice or Goods Declaration) is a simplification of this Master Data Model. Through a single submission of the UNeDocs Master Document, the parties can generate all required trade documents, both in paper and electronic format. This ensures that common data elements in the electronic documents, such as the goods item description or the consignor address, are interchangeable and that data requirements are met with a single submission of data.
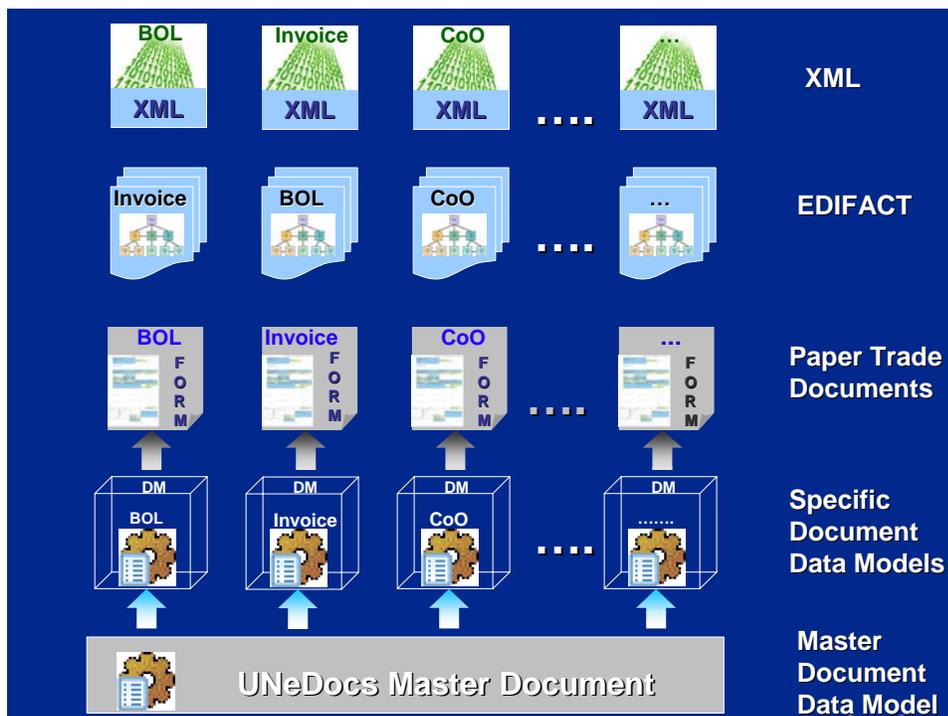
When evaluating the exchange requirements of a document, the document must be mapped against the UNeDocs Data Model, (see Appendix a for an example of the output of the data mapping) to identify any missing data. Missing data will need to be added to the Data Model before any outputs (e.g. XML schemas) can be produced. Business expertise is required when mapping documents to the Data Model and CCTS data modelling expertise is required when adding the data to the Master Data model.

Once all data for a required document has been included in the model, the XML schemas can be generated automatically (if you are using tools like the GEFEG FX tool), if not then XML Schema's should be manually generated in accordance with the UNCEFACT NDR's. In order for this to be implemented, it will also be necessary to provide an aligned "structure" for assembling each document including the business rules for completing the XML schema.

4.   UNeDocs Project Deliverables

4.1.   Recommended Deliverables:

- Project decision on and implementation of project tools.
- Project Team trained in usage of chosen project tools and in relevant UN/CEFACT standards.
- Standards publication strategy (web site, manual, etc.)
- Maintenance and upgrade strategy for the UNeDocs Model. Internal, external, support etc. This should outline the approach for managing change requests
- Customized Business Process Model describing the overall process and illustrating where the "in-scope" documents fit into the process. This Business Process Model should, if possible, be aligned to the UN/CEFACT International Supply Chain Reference Model.
- List of document types to be derived from the Customized Business Process Model
- Approved existing or customized version of the UNeDocs Master Data Model.
- Any proposed candidate change requests to the Core Components Library for submission to TBG17 (Defines any additional requirements or required modifications of the UNeDocs Core Components or Business Information Entities)
- A CCTS Payload-syntax Neutral Document Structure for each document type in the project document type list.
- For each document structure:
  - Approved, existing, new or customized Document Structures (Message Assembly)

- UN Layout Key Document & Box Completion Guidelines
- Approved existing, new or customized XML Schema
- UN/EDIFACT message implementation guide
- Other syntax mappings (where required) e.g. CARGOIMP message types or X12 etc. (EDI); RosettaNet, GS1, CIDX, etc. (XML).

5.   Project Steps

5.1.   Step 1 - Project Setup

- Approved Project proposal or charter – Purpose, scope, deliverables etc.

- Project Team formation – Project Team Leads, Editing Team, Experts (Business and Tools & Techniques)

- Tools – e.g. GEFEG FX modelling tool, Excel, etc.

- Recommended Training

    - Tools training
    - UMM and UML Training
    - Core Component Technical Specification
    - Using Core Components in UNeDocs
    - Mapping Data Requirements
    - Creating outputs

5.2.   Step 2 - Collation of required artefacts including:

- United Nations electronic Trade Documents (UNeDocs) Project
- UNECE reference web-site
- United Nations Layout Key (UNLK) (ISO 6422)
- United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT)
- United Nations Trade Data Elements Directory (ISO 7372)
- The UN/CEFACT International Purchase and Supply Chain Reference Model
- UN/CEFACT Unified Modelling Methodology
- UN/EDIFACT (ISO 9735)
- ATG XML Naming & Design Rules
- UNeDocs Scope Document

Identify and collate, as part of the project documentation, any appropriate UNeDocs and Business Process modelling artefacts, including the UNeDocs Scope document and existing relevant Business Requirements Specifications. This identification exercise can be expanded to include BRS owned by other standards organisations, although there may be a cost involved in the procurement of such.

5.3.   Step 3 - Data Harmonisation - the Collation and Analysis of required Data Elements

Data harmonization is an iterative process of capturing, defining, analyzing, and reconciling business or government information requirements. Iterative in this context means that this is a cycle. In the case of national projects it is highly unlikely that any government will be able to achieve harmonization of all agencies/departments and business to government requirements at one time. Prioritization should be considered and this could be based on volume or other government priorities such as revenue, supply chain security, etc. For example, every international trade transaction requires information for Customs, transportation, and statistics and these may therefore be considered as the first priorities. Another factor for selecting an agency or a particular business requirement is the willingness and desire to participate in the project. The important point is that after completing the first priorities, the process can be repeated as additional agencies participate and as additional requirements are identified.

The steps are defined as follows:

a)   **Data Capture** - Capturing means collating and identifying requirements. This can be accomplished in a number of ways such as a review of existing documents, automated systems requirements, regulations, etc. This captured information can be organized in an Excel spreadsheet or other software tool.

b)   **Definition and Analysis** - Defining the information requirement is critical. While information is identified by name, the definition or meaning i.e. what information is conveyed by the element, is more important. Another important step is to align the concepts identified with the terms defined in international standards such as the UN/CEFACT and WCO publications. Successful alignment at this stage can minimise greatly the amount of work involved in the next analysing and reconciliation stages. The process of analyzing the information consists of gathering similar data element names and having a full understanding of the definition and the information required. Typically this will be necessary because in collating the data requirements of several existing data exchanges many overlapping data elements will have been identified but these may well have different names and definitions in the different document or regulatory contexts. The analysis stage should identify all true overlaps and propose a common data element name and definition in each case.

c) **Reconciliation** - This is the final step in which there is an agreement to use one data element name, a common, definition, common coding, and standard messaging reconciled with the international standards of the United Nations Trade Data Elements Directory (UNTDED) and similar instruments such as the

World Customs Organization Data Model (WCO DM). This is achieved by aligning the collated data requirements names and definitions with these international standards. Where no match has been identified this should ideally be discussed with the appropriate standards agencies to identify whether this is a a new requirement which should be added to the existing published international standards, b) a misidentified data requirement or c) a national, regional or industry specific requirement that can be maintained separately.

Specific illustrations using a typical example of each of these steps follow:

a) Data Capture

In order to capture data element and information requirements, developers can begin by reviewing existing data exchange definitions contained in either paper or electronic formats. For example, if a 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 spreadsheet. The layout of the spreadsheet should contain the following information: data element name, data element description (definition), data element type (format, alpha, numeric, or alpha-numeric), domain (code list),
transport mode (marine, air, rail, road), process (import, export, transit), used for cargo, conveyance, or crew, and the data source (trade - carrier, importer, exporter, customs broker, etc). These are further defined below.

Another key element is to identify who, if any, is the authority legally regulated to collect any specific data set.   Developers may also wish to capture whether or not such an agency is authorized to collect and/or view the data, who is the source of the legal authority (law, regulation, executive order, etc.) and the expiry date of such authority.

Recommendations for types of information to collate are:

Data element name and/or number - The name of the data element being defined and any reference number that it may have in a recognised set of data definitions e.g. UNTDED 4 digit tag. 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 definition of the data element with as much detail as possible.
Data type - The data type can be either N (Numeric), A (Alpha) or AN Alphanumeric) and should include any known properties such as maximum and minimum lengths etc.
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 any specific mode of transport (truck, air, ship, rail, other) for which the data element maybe used.

Process - Indicate for which process the data element e.g. whether it is required for export, import or in-transit processes etc.

Category of use - Indicate at which level the data element is required e.g. for consignment, consignment item, invoice, means of transport, crew, or transport equipment etc.

Legal permission to collect or view - If relevant identify whether an agency is legally permitted to collect and/or view this data element.

Source of legal authority - If relevant identify the source of a legal authority which will collect and/or view the data element. Such an authority may be derived from a specific documentary convention, a regulation or other legal instrument, Memorandum of Understanding (MOU) or other. If there are multiple sources, all sources should be identified. **Expiration date of legal authority** – If known and relevant provide the date on which the legal permission to view and/or collect the data expires for an identified agency.

Data source - Indicate if the information is provided by a trader, a transport operator, a government agency, or is derived.. An example of a derived data element would be a data element that is calculated by or extracted from a reference file such as the rate of duty that could be extracted from a Harmonized Tariff file.

Timing, when data is required and provided – If known, identify the point in the relevant transaction's lifecycle at which the data element is required e.g. PRE-ARRIVAL, ARRIVAL, RELEASE, POST RELEASE or DATAWAREHOUSE etc.

After the collation exercise, the data harmonization starts by aggregating or merging the data elements identified from diffrent document sources into a comprehensive set. The following is an abbreviated representative sample of such an aggregation.

Illustration 1 - Sample aggregation of results of agency survey

NAME	DESCRIPTION	TYPE	SOURCE	MODE
Port of Unloading	Location where goods are removed from the ship	4 digit proprietary code	Carrier	Ship
Port of unlading	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

b) Definition And Analysis

The next stage is to conduct an analysis of the aggregated set of data elements.

For example an analysis of the above six sample data elements will quickly reveal a similarity of data element names (e.g. unlading or unloading) and minor variations in the definitions, e.g. domestic or foreign, the essence of the definition is the location where the goods are removed from the conveyance. By comparing with standardised vocabularies it will probably be determined that the terms "unlading" and "unloading" are synonyms. It could be determined that the terms "foreign" and "domestic" could be defined by the type of transaction for example because an export would show a foreign location and an import would show a domestic location. If it can be determined that each of these collated data elements are in fact referring to the same individual piece of data then it is also evident that this data element is provided by the trader and that it is required for all modes of transport.

Such an analysis can also reveal information about the coding of the data element. In this case it could find that there are three different coded representations of the same data element, a four-digit code, a five-digit code, and the United Nations Location Code (UNLOCODE).

Reconciliation

The next step is to reconcile and arrive at one name whenever synonyms have been discovered during the analysis stage. Considering our example where the result of the analysis was that unloading and unlading are synonyms, it should be preferred to use the term "unloading" as this is the term used within the names and definitions of the UNTDED. Further, since the analysis identified that ‚foreign' or ‚domestic' could be determined by function (export or import transaction) then these words could be eliminated. The reconciled name would then become "port of unloading". However, on further checking against the UNTDED it would be found that the name "port of unloading" is not a UNTDED data element name. The UNTDED name for this data element is in fact "place of discharge" in order to cover ports, airports and other transport locations. Finally as there were several coded representations of the location identified, these could be simplified and harmonised by an agreement to adopt the international standard of the UNLOCODE in all cases.

If during the data harmonization process any issues are difficult to resolve or additional information is required then it may be useful to contact the agency or other organisation that may be able to provide clarification.

5.4.   Step 4 - Modelling Stage- Review of UNeDocs data model against identified data requirements and identification of required changes and/or additions
- Review the UNeDocs data model selected as basis for project
- Identify and create additional data structures required to support the updated and new "in-scope" project document requirements as identified in Step 3
- Refine by marking any non-required structures i.e. 'click-off' any structures that are not reused.
- Create customized/refined/new copies of any reused UNeDocs document structures
- Create additional user documentation and business rules
- If international harmonisation is required, send updated regional/national UNeDocs Data Model to UNeDocs project team for review and comment.
- Sign off Project based UNeDocs data Model

5.5.   Step 5 - Documentation of UNeDocs Data Model change requests
- Formally submit these to the UNeDocs Project Team (who will pass this to relevant TBG WGs for submission to TBG17 if required).

5.6.   Step 6 - Development of CCTS document structures (message assemblies)
- Create 'Core' document structures for new document types

- – Document guideline including business rules e.g. use of this data element or structure is conditional on nature of goods, Mode of transport etc.
- – UN Layout Key Document & Box Completion Guidelines (where required)
  - ○ Select nearest existing master or specific document layout
  - ○ Specify required layout changes – boxes, box titles etc. (must be done with document owner)
  - ○ Produce updated UN/CEFACT Recommendation 1 compliant layouts and for each document and document box completion guidelines as required
  - ○ Review and sign off document artefacts with document owners (where document owner is external to the project
- – New or Customized XML Schema
  - ○ Auto generate UN/CEFACT Schemas from document guidelines, using project tool or manually produce.
  - ○ If XML schemas are to be manually generated, then this should be done using the UN/CEFACT NDRs.
- – UN/EDIFACT message implementation guide (where required)
  - ○ Develop mapping from customized data model to UN/EDIFACT document structures for each required UNSM type using project tool if functionality supported or manually produce in word processor or spreadsheet.
- – Other message implementation guide (where required)
  - ○ Develop mapping from customized data model to other syntax-specific standards document structures for each required document type e.g. CARGOIMP message types or X12 etc. (EDI), RosettaNet, GS1, CIDX, etc. (XML) using project tool if functionality supported or manually produce in word processor or spreadsheet.

5.7.   Step 7 - Publication
- As defined for the project

5.8.   Step 8 - Verification
- Review, update and acceptance of all project deliverables.

5.9.   Step 9 - Implementation
- In accordance with the published standards (executed externally with feedback loop)

5.10. Step 10 - Maintenance
- In accordance with the defined Project Maintenance strategy

6.   Compliance
- reuse of the UNeDocs data models
- specs are within the limits of the UNeDocs Standards and its deliverables

7.   Impact on Legacy Systems
One problem that Single Window developers may encounter is the effect of the use of international 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 scheme. Until such time as there is an overall conversion to the new data element names and coding, countries and traders may have to implement translation capabilities. This translation must convert the new, international standards and translate this to those data element names familiar to users and to those codes used in the legacy systems.