



PERMANENT TECHNICAL
COMMITTEE
- IN PERSON MEETING -
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239th/240th Sessions
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PC0717Ea

Brussels, 09 March 2023.

WCO Data Model
WCO DM Version 4.0.0

(Item VII on the Agenda)

SUMMARY

Purpose of document

The PTC supported the business needs to review and prepare a new version, i.e., version 4.0.0 of the WCO Data Model (DM), at its Meeting in October 2021. The PTC also approved the proposed scope of changes to the WCO DM and related marketing and guiding material. Version 4.0.0's preparatory work was completed by the Data Model Projects Team (DMPT) and will be submitted to the PTC in its Meeting in April 2023. The PTC will be invited to examine and endorse Version 4.0.0 of the WCO DM so it can be presented to the Policy Commission for endorsement and Council for approval in June 2023 and subsequently published.

Action required of the Permanent Technical Committee

The Permanent Technical Committee is invited to:

- examine and endorse Version 4.0.0 of the WCO DM.

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I. Background

1. The WCO DM has evolved into the universal language for cross-border data exchange over the past two decades. It was developed to provide a global standard for cross-border data requirements to foster collaboration and the exchange of information between Customs administrations, government regulators, and the business community.
2. Since then, the WCO DM has undergone three major releases. The current major version, version 3.*, was initially published in 2009 and has since been updated annually based on Data Maintenance Requests (DMRs) submitted by Members to the DMPT. The latest version of the version 3 series, namely version 3.11.0, was published in December 2021.
3. The DMPT has discussed the need to undertake a comprehensive review of the current WCO DM version and the need to publish a new major version (version 4.0.0) to improve the WCO DM, introduce new capabilities, and increase its level of adoption.

II. Version 4.0.0 Work Packages and Deliverables

4. The comprehensive review of the WCO DM was organized as Work Packages based on the review proposal approved by the PTC at its Meeting in October 2021. The Work Packages include the following:

Work Item	Code	Deliverable	Annex
a. Clean-up items		Clean-up items overview	Annex II
b. Reorganization of the Base Information Packages	2021-2	WCO DM Technical Guidance on Information Packages	Annex III
c. Improve the location of the WCO DM on the WCO Members' website (visibility)	2021-4	Improve the location of the WCO DM on the WCO Members' website (visibility) report Updated WCO DM Technical and Non-Technical Guidance on: <ul style="list-style-type: none"> • WCO DM Version 4.0.0 Overview; • Business Guide; • Basic Principles; Introduction; and Building Blocks. 	Annexes IV, V, and VI
d. Place the WCO DM logo on the website and other publication material for Version 4.0.0 (branding)	2021-5	WCO DM Logo	Annex VII

e. Add support to the OpenAPI interchange protocol	2021-8	Open API Guidelines	Annex VIII
f. Add support to the JSON electronic message format	2021-7	JSON Guidelines	Annex IX
g. Improve the look and feel of the publication package	2021-9	WCO DM App	Paragraph 24 of Annex I to this document, <u>WCO DM App</u>
h. Add new guiding information for the three main classes, namely the BorderTransportMeans, Consignment, and GoodsShipment, on their specific levels of usage	2021-10	WCO DM Technical Guidance on the use of the three main classes, namely the BorderTransportMeans, Consignment, and GoodsShipment	Annex X

5. The DMPT has aimed at finalizing the approved version 4 work package and having it published by June 2023 following the final endorsement of the Policy Commission and Council approval. Interested DMPT Members have contributed to developing version 4.0.0 in the intersession in a Mini-Group coordinated by the United States. The Mini-Group met regularly and updated the DMPT on the progress of its work at every DMPT Meeting.
6. The DMPT has examined version 4.0.0 of the WCO DM and other related deliverables at its 65th Meeting in February 2023. The DMPT agreed to submit version 4.0.0 of the WCO DM and other associated deliverables to PTC for endorsement.
7. The details of version 4.0.0 Work Packages and deliverables are attached as Annex I to this document. The PTC is invited to endorse version 4.0.0 of the WCO DM and other related deliverables so that it can be presented to the Policy Commission for endorsement and Council for approval in June 2023 and subsequently published.

III. Action Required of the PTC:

8. The PTC is invited to:
- examine and endorse Version 4.0.0 of the WCO DM.

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I. Version 4.0.0 Work Packages and deliverables include:

I.a. Clean-up items

1. Version 4 includes changes following a comprehensive review of the current version and aims to identify and resolve errors and inconsistencies. This resolution of issues is expected to reduce confusion, make the DM easier to use, and offer a higher-quality product.
2. The Mini-Group, led by the Version 4 Project Manager from the United States, conducted the review, and 23 areas for clean-up were identified. The changes resulting from the fixes of these clean-up items were modelled by the Data Model Architect in beta versions and published in the preview version of the WCO DM App¹. After each beta version was published, the quality control process was carried out by reviewers, and the results were fixed in the following beta version.
3. In line with the WCO DM Maintenance Procedure, Data Maintenance Requests for the respective clean-up item areas were prepared by the Version 4 Project Manager and submitted to and approved by the DMPT at its 63rd Meeting in May 2022.
4. An overview of the clean-up items is attached as Annex II to document PC0717. Furthermore, the Mini-Group uses a comprehensive Excel document to undertake the clean-up items' quality control process and keep track of the results. Interested DMPT delegates are invited to email dm@wcoomd.org to request access to this Excel document.

I.b. Reorganization of the Base Information Packages (2021-2)

5. The reorganization of the Base Information Packages (BIPs) was proposed to enhance the clarity of each information package (IP) of the WCO DM by naming the IPs based on their purpose and by removing data duplication in structures.
6. Currently, there are five BIPs, namely: Declaration, LPCO², Response, Intergov, and the Meta Data BIPs. It was noted that Declaration and LPCO are BIPs with true business information, while the Response and Intergov BIPs act as wrappers or envelopes for other BIPs. The Meta Data BIP does not contain business information and focuses on technical information about data exchange. To that end, it was proposed to remove Response and Intergov from the BIP group and create a new group for them: "Additional Information Package" AIP. A separate type of IP was proposed for the Meta Data BIP, "Meta Data Information Package (MDIP).
7. The reorganization of the BIPs is also done by streamlining and eliminating overlaps in the use of data objects in the BIPs. The current Response BIP, for instance, is associated with the Declaration class. The Declaration class associated with the Response and Intergov BIP requires a separate maintenance process and presents the risk of misalignment with the main information of the Declaration BIP. To mitigate

¹ <https://preview-datamodel.wcoomd.org/>

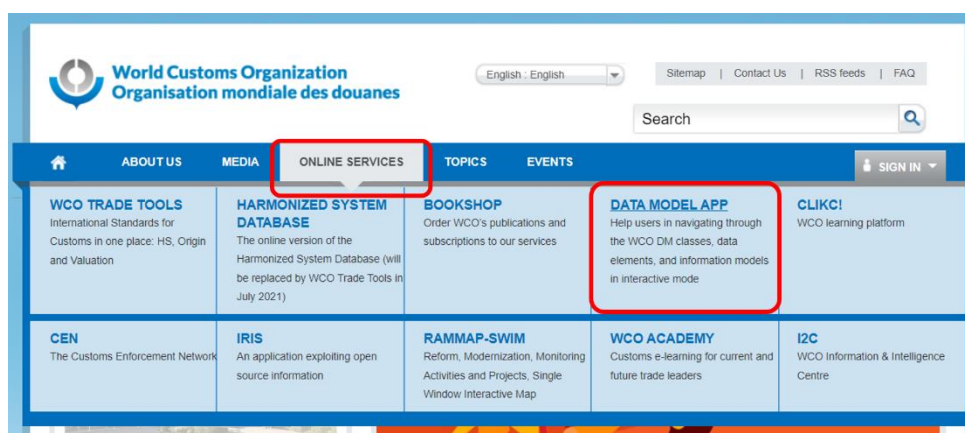
² Licence, Permit, Certificate or Other

complexity and possible misalignment in maintaining the declaration information of Response and Intergov, the association of both AIPs with the Declaration class has been removed. When the original declaration information needs to be attached in a Response or Intergov message, the information will be "loosely attached" to the "parent" AIP message.

8. The reorganization of the BIPs would make mapping less confusing by offering clear guidance, and would significantly lessen the effort needed to use and maintain the DM by removing data duplication. The reorganization of the BIPs would also provide benefits in making the mapping, modelling and Quality Control (QC) easier.

I.c. Improve the location of the WCO DM on the WCO Members' website (visibility) (2021-4)

9. The DMPT pointed out the importance of improving the visibility and accessibility of information relating to the WCO DM to help increase the level of its adoption. Currently, the WCO DM landing page is located deep in the menu structure of the WCO Members' website and, therefore, is difficult to find.
10. The activity 2021-4 was proposed to address the issue. The proposal included a task for the WCO Secretariat to update the WCO Members' website and include direct access to the Data Model App as part of the set of online services provided by the WCO which are available on the menu on the WCO homepage, as shown in the picture below:



11. In addition, the WCO DM landing page³ and the overview regarding the landing page⁴ were updated with fresh information regarding the WCO DM. A Search Engine Optimization (SEO) functionality was added to the WCO DM App. The SEO ensures that a web search with the keywords "WCO Data Model" lists the WCO DM App in the top level of the search results.
12. The first group of guidance documents was reviewed and revised in connection with this work, and keep the WCO DM guidance material provided to WCO Members updated. These revisions aim to include newly added features in the most recent version of the WCO DM, including updated information for the upcoming major release

³ <http://wcoomd.org/DataModel>

⁴ <https://www.wcoomd.org/en/topics/facilitation/instrument-and-tools/tools.aspx>

of version 4.0.0. The updated technical and non-technical guidance are the Business Guide; WCO DM 4.0.0 One Pager, Basic Principles; Introduction; and Building Blocks.

13. All guidance material related to the WCO DM will be published under the "Guidance" menu⁵ of the WCO DM App in wiki format.

I.d. Place the WCO DM logo on the website and other publication material for Version 4.0.0 (branding) (2021-5)

14. Clear brand awareness is crucial for the success of the WCO DM. A logo and its consistent use ensure a uniform appearance and recognizability across the various offline and online publications.
15. Accordingly, the WCO DM logo – attached (in English and French) as Annex VII to document PC0717 – was created in cooperation with the WCO Communications Department, following the WCO Corporate Identity Guidelines and with the additional colour variants white with black outlines (for use on monochrome publications) and white (for use on dark backgrounds).
16. The logo is on the WCO DM landing website⁶ and the WCO DM App⁷, as well as on a roll-up for booths at various events (including, for the first time, the 139th/140th Session of the Council and the WCO Technology Conference 2022 in Maastricht). It is intended that the logo will be used throughout new and revised publications.

I.e. Add support to the OpenAPI interchange protocol (2021-8)

17. The activity 2021-8 aimed to enable the implementation of the WCO DM in modern data exchange environments where prominent data exchange methodology is used for IT projects. To this end, the DMPT agreed to explore supporting the implementation of the WCO DM with OpenAPI by developing guidance material.
18. OpenAPI is a set of open specifications used for describing APIs to address the challenges of standardizing and documenting these APIs. The OpenAPI specifications are language-agnostic and allow humans and computers to discover and understand a service's capabilities without access to its source code. OpenAPI is considered a popular data exchange framework which many solution providers increasingly support. Such a trend would be expected to give Customs more access to affordable but high-quality expertise for their OpenAPI-based data exchange projects.
19. To this end, and in order to assist IT system developers and solution providers with a basic set of rules to establish OpenAPI documents based on the WCO DM, the Guidelines were drafted to ensure that the specified electronic messages based on the OpenAPI document comply with the WCO DM. The Guidelines include a definition of what the final WCO DM compliance OpenAPI document may look like. The Guidelines addressed the schema definition of OpenAPI and excluded service definitions from the scope.

⁵ <https://datamodel.wcoomd.org/#/wiki/index>

⁶ <http://wcoomd.org/DataModel>

⁷ <https://datamodel.wcoomd.org/>

I.f. Add support to the JSON electronic message format (2021-7)

20. Proposal 2021-7 to support the use of the JSON electronic message format was introduced in connection with proposal 2021-8 relating to OpenAPI. JSON is an electronic message format that is supported by the OpenAPI specification. The JSON Guidelines assist developers with basic rules to establish JSON messages based on the WCO DM and corresponding OpenAPI specification. The Guidelines include the definition of what the final JSON message looks like.
21. The proposal to support the JSON format was considered given the various advantages it offers. JSON is an electronic format that is ubiquitous on the world wide web (the internet) and used by many web services. By design, JSON messages are relatively lightweight, thus helping increase electronic message processing efficiency. Furthermore, the JSON format is considered clean and human-readable.
22. As an electronic message format considered popular compared to others, JSON is supported by many IT providers and system developers, opening up wider access to more affordable but high-quality IT solutions.
23. The JSON Guidelines were developed by maintaining consistency with the OpenAPI Guidelines rules. When implemented correctly, an OpenAPI document developed on the basis of the OpenAPI Guidelines will result in a JSON message that complies with the JSON Guidelines.

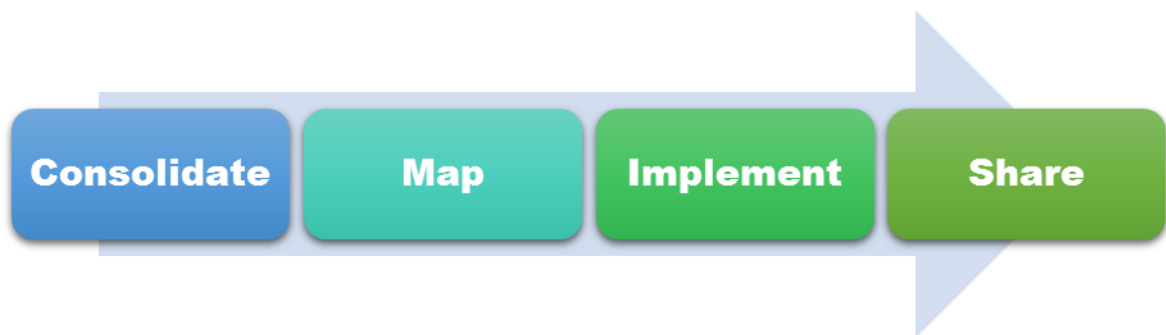
I.g. Improve the look and feel of the publication package (2021-9)

24. The WCO DM is a product of the WCO standardization process that contains highly technical and complex information. In the past, the WCO DM packages were published as a collection of spreadsheets on the WCO website. The spreadsheets helped users to navigate different WCO DM components, e.g. classes, data elements, information packages, etc. However, spreadsheets were not the best tool to help users comprehend the relationships between these components.
25. A proposal to improve the look and feel of the WCO DM was added to enhance the WCO DM publication package, make the product more professional, and help users easily comprehend all the technical aspects and complexities of the WCO DM.
26. Accordingly, the WCO Secretariat developed an interactive web application: WCO DM App⁸. The App has several features:
 - Library explorer: to navigate through the WCO DM Classes and Data elements with a clear relationship between them;
 - Information package structure: to display the structure and levels of data elements in the context of an Information Package;
 - Download: to navigate through all downloadable files; and
 - Data Maintenance Requests (DMRs): to submit DMRs by Members online.

⁸ datamodel.wcoomd.org

27. Intended for version 4.0.0, the DM App was launched early so that version 3.11.0 of the WCO DM could be published in December 2020. The App was maintained with Continuous Delivery (CD) methodology, which allows feedback provided by users of the App to be implemented as quickly as possible. The early launch and CD approaches were selected to ensure that the App sufficiently matured when version 4.0.0 of the WCO DM is released in June 2023.

28. In addition to the main features, two additional features of the DM App – the WCO DM Mapping Tool and Repository of My Information Packages (MyIPs) – were added in the preview⁹ version of the DM App. They were added to the preview version, given the complexity of their functionalities, the need for extensive testing, and the need to avoid possible disruption to the main features. The objective of the Mapping Tool and Repository of MyIPs was to assist Members in implementing the WCO DM, using the four WCO DM Implementation Steps towards the national dataset:



- Consolidate the national dataset from available sources, such as paper template, IT database design, the technical annex of regulations/legal framework on data requirements;
- Map the consolidated national dataset to the WCO DM using the Mapping Tool to create a subset of the WCO DM (i.e. MyIP) that fits the national needs;
- Implement the output of the MyIP (e.g. UML Class Diagram, XML Schema, OpenAPI document) in an IT system (e.g. to create a WCO DM-compliant system interface/middleware); and
- Share MyIP with relevant stakeholders (e.g. traders, solution providers and other Members) through the Repository of MyIPs.

29. The Mapping Tool and Repository of MyIPs, including their content, will be integrated into the main features and migrated to the production version of the App by June 2023.

1.h. Add new guiding information for the three main classes, namely the BorderTransportMeans, Consignment, and GoodsShipment, on their specific levels of usage (2021-10)

30. The WCO DM information model was designed to allow maximum reuse of data objects and minimum redundancy. It means that a class or data element can be used multiple times in different contexts of Cross-Border Regulatory Procedures (CBRPs). The recurrence of the main classes in different levels of Overall Information Structure

⁹ preview-datamodel.wcoomd.org

(OIS) often needs clarification as to which instance of the class should be used in an electronic message.

31. The Guidance was proposed to address the issue and ensure consistency and clarity as to which instance of the main classes within the WCO DM should be used in particular national procedures.
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