UN/CEFACT 2023 Spring Forum

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Introducing CCL, RDM and BRS development methodologies for UN/CEFACT Business Standards Projects

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UN/CEFACT Key Outputs

• Business Standards
  • Process Models (BRS)
  • Reference Data Models (RDMs)
  • Semantic Libraries (UNTDED, Core Component Library (UNCCL) and UN/XML)
• Trade Facilitation Recommendations
• Technical Specifications
UN/CEFACT Open Development Process for Business Standards

https://unece.org/trade/uncefact/policiesprocedures-and-termsreference

Stage 1: Project Inception
Stage 2: Requirements Gathering
Stage 3: Draft Development
Stage 4: Public Review (Optional)
Stage 5: Project Exit
Stage 6: Publication
Stage 7: Maintenance (Optional)
UN/CEFACT Business Standards Deliverables

- **1:** Business Requirements Specification (BRS) including
- **2:** Business Information Entity Discovery
- **3:** CCL submission (optional)
- **4:** CCBDA subset of Reference Data Model
- **5:** Technical Artefacts production
Standardising Business Processes & Data

UN/ISCRM
Int’l Supply Chain Ref. Model
Processes harmonized with all other existing business processes

BRS
Business Requirement Specification
Creates a high-level semantic description of business processes for a specific scope

CCTS
Core Component Technical Specification
The modelling methodology which enables the development and maintenance of the CCL library

UN/CCL
Core Component Library
A semantic library of CCTS classes
Data harmonized across all BRS domain business processes

UN/CEFACT Modelling Methodology
Methodology to document business process models and their relations within the BRS library

CCBDA - MA
Core Component Business Document Assembly – Message Assembly
 Defines the data elements which are to be exchanged in the business processes covered by a BRS
What data for the business processes?

UN/XML and JSON (future)

Reference Data Model
Logical subsets of the UN/CCL that represent a specific context

UN/EDIFACT

Naming & Design Rules
Defines how to create a sample XML and JSON schema from the CCBDA data exchange subsets

RDM

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UN/CEFACT International Supply Chain Process Model

**Commercial Procedures**
- Establish Contract
- Order Goods
- Advise On Delivery
- Request Payment
- Packing
- Inspection
- Certification
- Accreditation
- Warehousing

**Transport Procedures**
- Establish Transport Contract
- Collect, Transport and Deliver Goods
- Provide Waybills, Goods Receipts, Status reports etc.

**Regulatory Procedures**
- Obtain Import/Export Licences etc
- Provide Customs Declarations
- Provide Cargo Declaration
- Apply Trade Security Procedures
- Clear Goods for Export/Import

**Financial Procedures**
- Provide Credit Rating
- Provide Insurance
- Provide Finance
- Execute Payment
- Issue Statements

**IN Volves**
- Prepare for Export
- Export
- Transport
- Prepare for Import
- Import

BUY
SHIP
PAY

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One link in a global supply chain

- Most dematerialization projects are only looking at one sectoral view
  - Almost all sectoral views are just one part of a global supply chain
  - The international supply chain is very complex (multiple actors and multiple relations in data exchanges)

- A holistic view and approach are needed
  - Information will not be related purely to goods or purely to transport or purely to regulatory
  - There are clear links between the information in each part of the global supply chain

- UN/CEFACT deliverables all take this holistic approach
  - Cross Industry
  - MultiModal
  - Cross-border Agencies
The actors

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**Actors/Roles**
- **Customer**
  - Buyer
    - Invoicee
    - Payor
    - Importer
    - Consignee
    - Transport Services Buyer
  - Order (Sales)
    - Ship (Transport/Border Clearance)
    - Pay (Sales)
- **Authority**
  - Customs
    - OGA
    - Chambers of Commerce
    - Port Health
    - Inspection
    - Licensing
    - etc.
  - Intermediary
    - Transport Services Provider
    - Bank
    - Credit Agency
    - Customs Agent
    - Insurer
    - etc.
- **Supplier**
  - Seller
    - Manufacturer
    - Invoicer
    - Payee
    - Exporter
    - Consignor
    - Transport Services Buyer

**Actors/Roles**
- **Supply Chain**
  - Identify Potential Trading Partner
  - Check Credit
  - Manufacture

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Basis for Semantic Interoperability

Agreed and Harmonised

• Party and Role Definitions
• Semantic Anchors
• Message Structures
• Contextualised Code Subsets
• Contextualised Business Rules
Global Trade – Semantic Anchors

Shipment (Trade Delivery)

- A shipment is an identifiable collection of one or more Trade Items (available to be) transported together from the Seller (Original Consignor/Shipper) to the Buyer (Final/Ultimate Consignee):
  - A Shipment can only be destined for one Buyer
  - A Shipment can be made up of some or all Trade Items from one or more Sales Orders
  - A Shipment can have only one Customs UCR
  - A shipment may form part or all of a Consignment or may be transported in different Consignments.

Consignment

- A consignment is a separately identifiable collection of Consignment Items (available to be) transported from one Consignor to one Consignee via one or more modes of transport as specified in one single transport service contractual document:
  - A Consignment can only have one Transport Service Buyer
  - A Consignment can only have one Transport Service Provider
  - A Consignment can only have one Consignor
  - A Consignment can only have one Consignee
  - The Transport Service Buyer can be either the Consignor or the Consignee
  - A Consignment is made up of one or more Consignment Items
  - A Consignment can be made up of some or all Trade Items (aggregated into Consignment Items) from one or more Shipments
Overview of BRS Development Process

• A BRS MUST start with a clear specification of the scope of the project and where this project fits into a global context of business operations and MAY refer to a UMM model of the business domain.

• The Scope MUST be specified in terms of the Business Processes that are involved and the Business Entities about which information is to be exchanged by the participants who are involved directly in the Information Exchanges that support the related business process. It MUST also indicate stakeholders who have an interest in the processes, or may participate in related processes, and whenever appropriate, what is out of scope of this particular project. The process and information flows that constitute the business process, the business rules that govern the exchanges and the details of the information that is to be exchanged during these processes, SHOULD then be elaborated.

• The requirements MUST first be specified in business terms and then expressed in formalized terms. The business requirements MUST be presented as a numbered list so as to facilitate a check to be made that all requirements have been met in the eventual e-commerce solutions proposed. As the process of completing a BRS progresses, new requirements may be recognized and added to the list.
The resulting BRS will include text, templates (worksheets) and diagrams, and may refer to a UMM model of the domain. To help with future re-usability, interoperability and to provide a degree of standardization in the developing a BRS, an initial set of preferred terms is provided in Annex 2.

To minimize the work in creating a new BRS, improve harmonisation and encourage reusability, wherever possible, any relevant existing BRSs artefacts or UMM models SHOULD be used as a basis for producing the new requirements.

A high level BRS MAY be used to define the context and scope of a domain that is refined by a cascade of more specific BRSs.

For example, the Business Requirements Specification Cross-Border Supply Chain (UNeDocs) ECE/TRADE/C/CEFACT/2007/8. This BRS sets the scope for the Common Supply Chain BRS which in turn sets the scope for more specific BRSs for: Ordering, invoicing, etc.
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UN/CEFACT evolution/revolution – Reference Data Models

Benefits of UN/CEFACT Semantic Models

• The support for information sharing, such as enabled by data pipelines, with the timely capture of quality data from original data sources ensuring supply chain visibility

• Reduction of administrative burden by efficient reuse of data shared within the BUY SHIP PAY domain model

• Standardized data exchange structures, based on common Master data exchange structure and independent of exchange syntax

• Common basis for implementing in chosen data exchange syntax(es)
UN/CEFACT International Supply Chain Reference Data Model Family

Buy/Ship/Pay RDM

- Supply Chain RDM (SCRDM)
- Multimodal Transport RDM (MMT)
- Cross-Border Management RDM

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CoreComponent→ABIE contextualisations

Example Person Core Component
80 Attributes
27 Associations incl.
17 reuses as Business Information Entities

Reuse example:
Transport Person for IMO FAL

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RDM CCBDA Data Exchange Structure Relationships

- Exchange Header
- Regulatory Header
- SHIP
- BUY
- PAY
Supply Chain (SCRDM) Master Message Structure

- Supply Chain Context
- Reuses just under 10% of the Reference ABIEs from Core Component Library
- Customised set of BSP ABIEs
Transport & Logistics (MMTRDM)
Master Message Structure

- MultiModal Transport
- Reuses just 10% of Reference Component Library
- Customised set of BSP ABIEs

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Sample Transport CCBDA Subset Data Exchange Structures

Bill of Lading/IFTMCS
- Document Context
  - Exchanged Document
    - Declaration Header
    - Transport Movement
    - Consignment
    - Transport Equipment
    - Transport Service

Container BayPlan/BAPLIE
- Document Context
  - Exchanged Document
    - Declaration Header
    - Transport Movement
    - Consignment
    - Transport Equipment
    - Transport Service

Operational Manifest/IFCSUM
- Document Context
  - Exchanged Document
    - Declaration Header
    - Transport Movement
    - Consignment
    - Transport Equipment
    - Transport Service

Customs Cargo Report/CUSDEC/GOVCBR
- Document Context
  - Exchanged Document
    - Declaration Header
    - Transport Movement
    - Consignment
    - Transport Equipment
    - Transport Service
UN/CEFACT Publication Transport Example: electronic Road Consignment Note (eCMR)

- **BUY SHIP PAY (BSP)**
  - Semantic model
  - Subset of UN/CCL

- **BUY SHIP PAY**
  - Master message structure

- **MMT subset**
  - Exchange syntax-neutral data exchange structure

**SHIP Master message structure**

**CCL subset**

**eCMR message structure**

**Syntax Instantiation e.g.**
- XML schema, JSON LD?

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Core Component Dictionary Entry Names and Definitions
Built-in mappings to UNTDED, UN Layout Key and UN/EDIFACT

- UNTDED
- UN Layout Keys
- UNCL Codes
- UNTDID
- EDIFACT
UN/CEFACT Core Component Library

Business Information Entities (BIEs)
Reuses of Object Class Library in different business Contexts
(D23A ~ 1350 BIEs)

Semantic Foundation - Core Component (CCs)
Object Class Library
(D23A ~ 650 CCs)
ISO 11179
Tripartite Data Element Naming

Object Class Term + Property Term + Representation Term

the primary concept or Object Class of the data element

the distinguishing characteristic or Property of the Object Class

the form or Representation of the data element

Example: Country + Name + Text
CCTS Naming Convention

- The Dictionary Entry Name of any Core Component is unique
- Dictionary Entry Names consist of Object Class Terms, Property Terms, Representation Terms, Qualifiers and Special Terms (like “Details” or “Type”)
- Dictionary Entry Names are ISO11179 compliant
- Terms are separated by a period (.) and a single space
- Qualifiers are separated by an underscore (_) and a space
- Multiple words are separated by spaces (no CamelCase!)
How CCL growth is managed

Library Maintenance Team responsible for
• Cross-Domain Harmonisation

Project Teams responsible for
• Contextualised RDM development, CCL submissions and customised data exchange structures

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### Example CCL Submission

<table>
<thead>
<tr>
<th>ADD/CHG</th>
<th>ACC/ BCC/ ASCC</th>
<th>Dictionary Entry Name (auto generated)</th>
<th>Definition Mandatory</th>
<th>Object Class Term</th>
<th>Property Term</th>
<th>Representation Term</th>
<th>Associated Object Class</th>
<th>Occurrence Min</th>
<th>Occurrence Max</th>
<th>Version</th>
<th>Ref Library Version</th>
<th>Submitter Name</th>
<th>Unique submitter CR ID</th>
<th>Short Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACC</td>
<td>BCC</td>
<td>Aggregate Core Component</td>
<td>Basic Core Component contained within the ACC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ASCC</td>
<td></td>
<td>Associated (Aggregate) Core Component associated with the ACC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADD</td>
<td>ASCC</td>
<td>Consignment Item. Specified. Risk Analysis Result</td>
<td>A results of a risk analysis calculation for this consignment item</td>
<td>Consignment Item</td>
<td>Specified</td>
<td>Risk Analysis Result</td>
<td></td>
<td>0</td>
<td>unbounded</td>
<td>1.0</td>
<td>D21A COVID-19 Multimodal COVID-15CC001Risk Analysis Result</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADD</td>
<td>BCC</td>
<td>Dangerous Goods. Radioactive. Indicator</td>
<td>The indicator of whether or not these dangerous goods are radioactive.</td>
<td>Dangerous Goods</td>
<td>Radioactive</td>
<td>Indicator</td>
<td></td>
<td>0</td>
<td>1</td>
<td>1.0</td>
<td>D21A COVID-19 Multimodal COVID-15CC002Radioactive Indicator</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADD</td>
<td>ASCC</td>
<td>Dangerous Goods. Stated. Condition</td>
<td>A stated condition of these dangerous goods</td>
<td>Dangerous Goods</td>
<td>Stated</td>
<td>Condition</td>
<td></td>
<td>0</td>
<td>unbounded</td>
<td>1.0</td>
<td>D21A COVID-19 Multimodal COVID-15CC003Stated Condition</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADD</td>
<td>ASCC</td>
<td>Radiactive Isotope. Specified. Radionuclide</td>
<td>Radioclad details specified for this radionuclide isotope</td>
<td>Radioclad Isotope</td>
<td>Specified</td>
<td>Radionuclide</td>
<td></td>
<td>0</td>
<td>unbounded</td>
<td>1.0</td>
<td>D21A COVID-19 Multimodal COVID-15CC004Specified Radionuclide</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADD</td>
<td>BCC</td>
<td>Material. Radioactive Package Transport Index. Code</td>
<td>The number (rounded up to the next tenth) assigned to and placed on the label of a fissile material package, to designate the degree of control of accumulation of packages, overpacks or freight containers containing fissile material during transportation</td>
<td>Material</td>
<td>Radioactive Package Transport Index</td>
<td>Code</td>
<td></td>
<td>0</td>
<td>unbounded</td>
<td>1.0</td>
<td>D21A COVID-19 Multimodal COVID-15CC005Radioactive Package Transport Index</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADD</td>
<td>BCC</td>
<td>Material. Fissile Criticality Safety Index. Numeric</td>
<td>The number (rounded up to the next tenth) assigned to and placed on the label of a fissile material package, to designate the degree of control of accumulation of packages, overpacks or freight containers containing fissile material during transportation</td>
<td>Material</td>
<td>Fissile Criticality Safety Index</td>
<td>Numeric</td>
<td></td>
<td>0</td>
<td>1</td>
<td>1.0</td>
<td>D21A COVID-19 Multimodal COVID-15CC006Fissile Criticality Safety Index</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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### Multi-Modal Transport Reference Data Model (MMT-RDM)

- White Paper on RDM [English](#) [French](#) [Russian](#)
- RDM Guidelines
- BRS
- Executive Guide on RDM [English](#) [French](#) [Russian](#)
- Structure Report / Data Elements
- XSD Schema
- UML Diagram
- HTML Index

### International Forwarding and Transfer

- Multimodal Booking
- Multimodal Shipping Instruction
- Multimodal Waybill
- Multimodal Status Report / Request
- Road Consignment Note (eCMR)
- Maritime Bill of Lading
- Inland Waterway Bill
- Rail CIM-SMGs (URL)
- Rail SMGS
- Rail Wagon List
- Air Waybill
- Air Dangerous Goods Declaration
- Air Consignment Security Declaration
- Smart Containers
- Pipeline Data Exchange Standard (PDES)
- IMO FAL Compendium

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**RDM Artefacts**

**CCBDA Subset**

**Business Standards**

**Based on MMT RDM**

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Example Business Standard Streamlined Publications 2

Transport and Logistics

Multi-Modal Transport Reference Data Model

International Forwarding and Transfer

- BRS Overall
- XSD Schema
- UML Diagram
- XLS Guideline Structure
- Spreadsheet
- HTML
- JSON Schema

RDM Artefacts

Business Standard CCBDA MMT Subset Artefacts