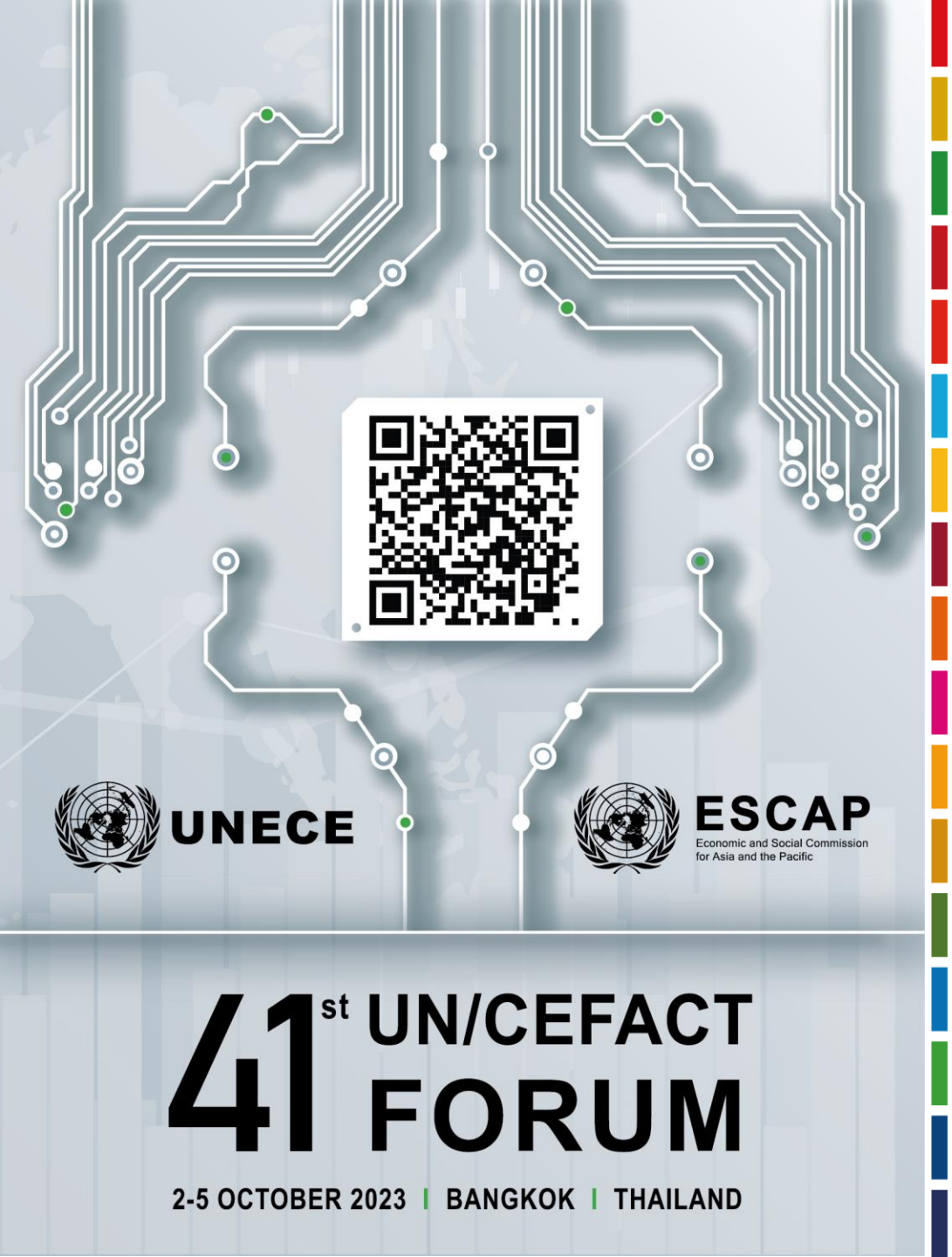


UN/CEFACT 2023 Autumn Forum

Monday, 02 Oct 2023

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

Sue Probert (Chair)
suesiprobert@live.com

UN/CEFACT Key Outputs

- Business Standards
  - Process Models (BRS)
  - Reference Data Models (RDMs)
  - Semantic Libraries (UNTDED, Core Component Library (CCL) and UN/XML)
- Trade Facilitation Recommendations
- Technical Specifications

UN/CEFACT Open Development Process for Business Standards

Open Development Process ECE/TRADE/C/CEFACT /2016/17	Provides a description of the sequence how projects are carried out within UN/CEFACT	PDF	PDF	PDF

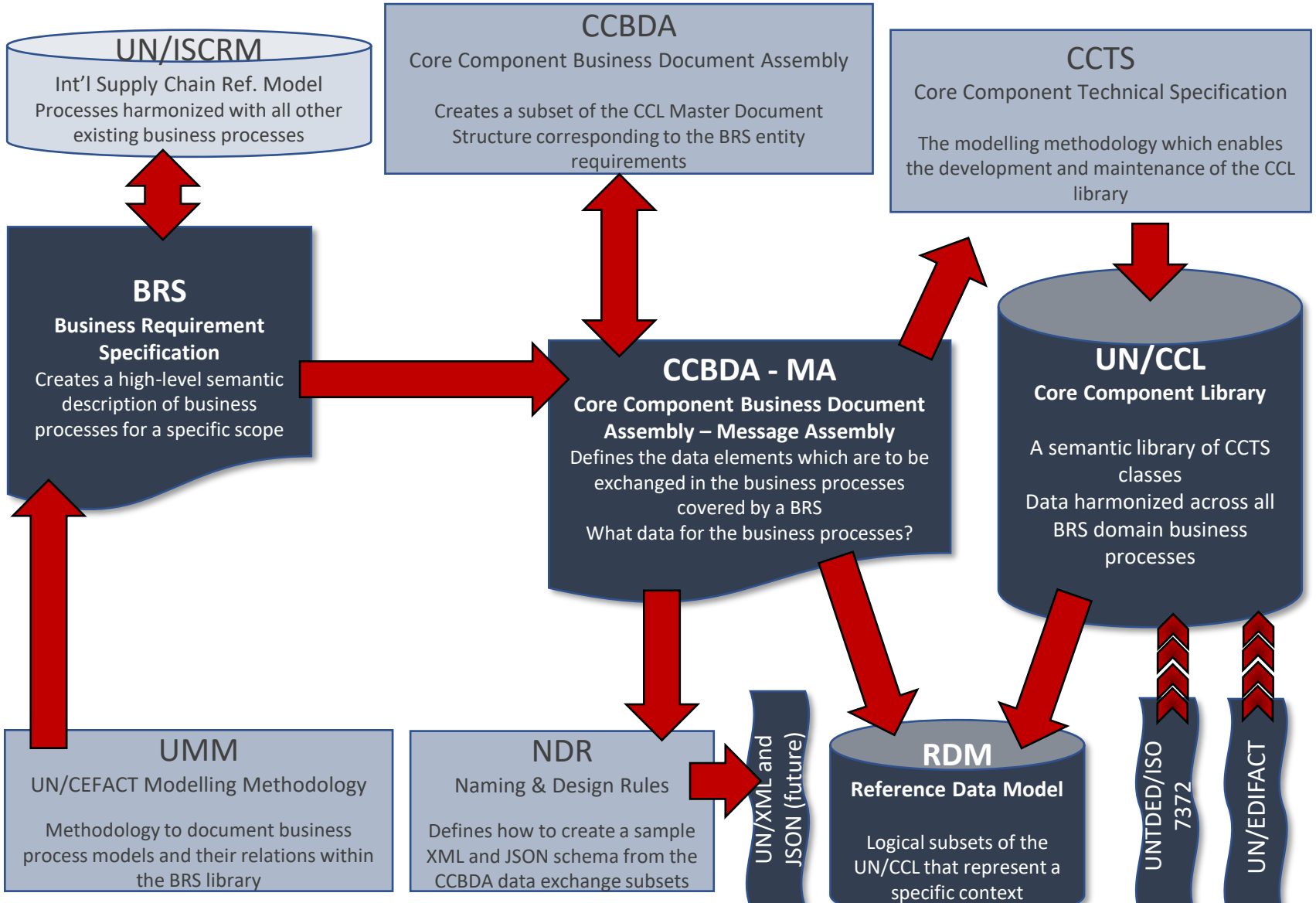
https://unece.org/trade/uncefact/policiesprocedures-and-termsreference

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/CEFACT Business Standards Deliverables

1: Business Requirements Specification (BRS) including

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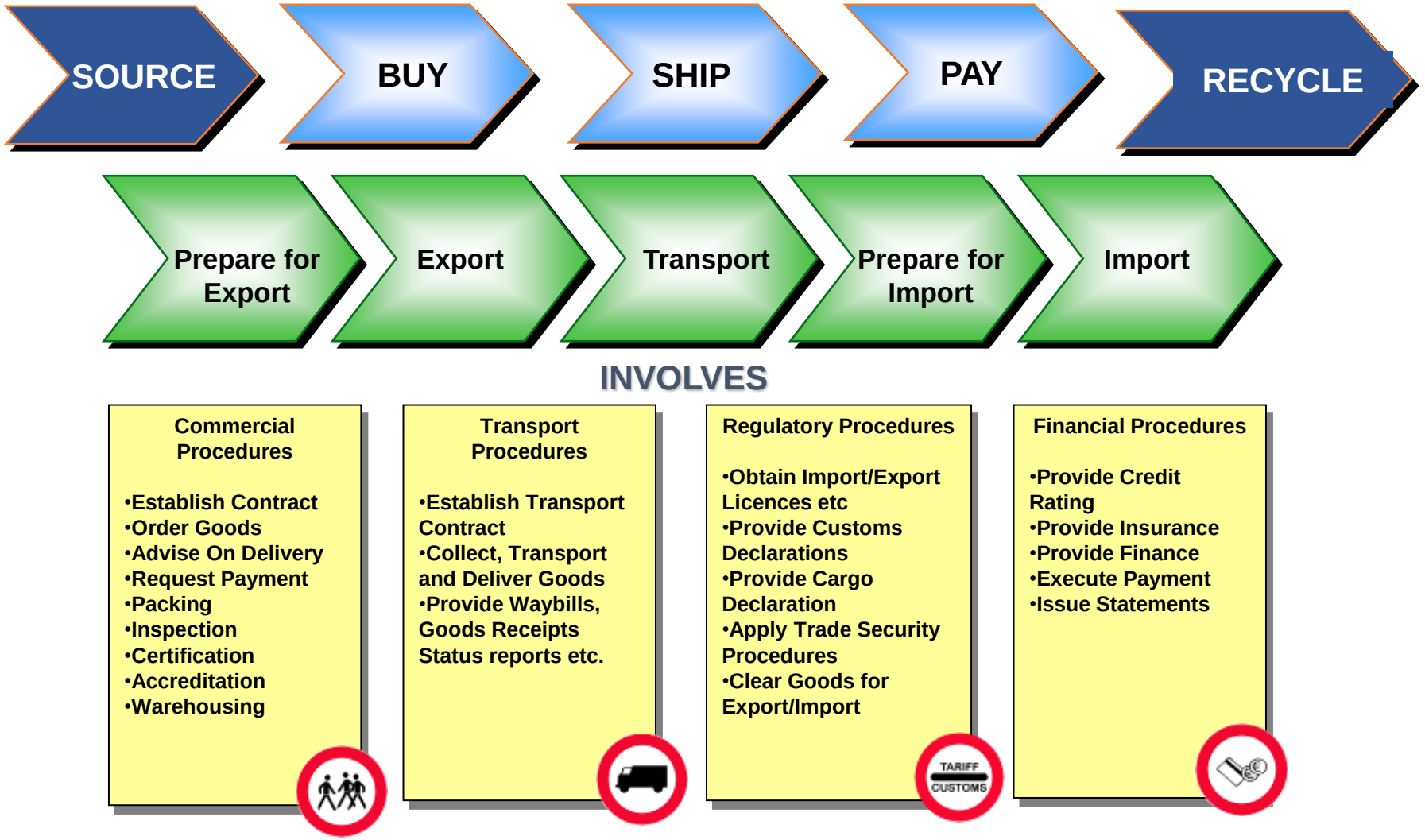
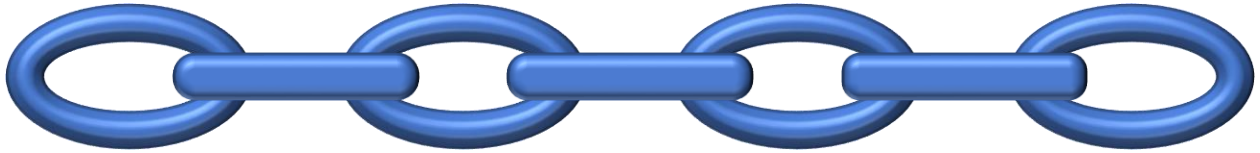
UN/CEFACT International Supply Chain Process Model



Linking across global supply chains



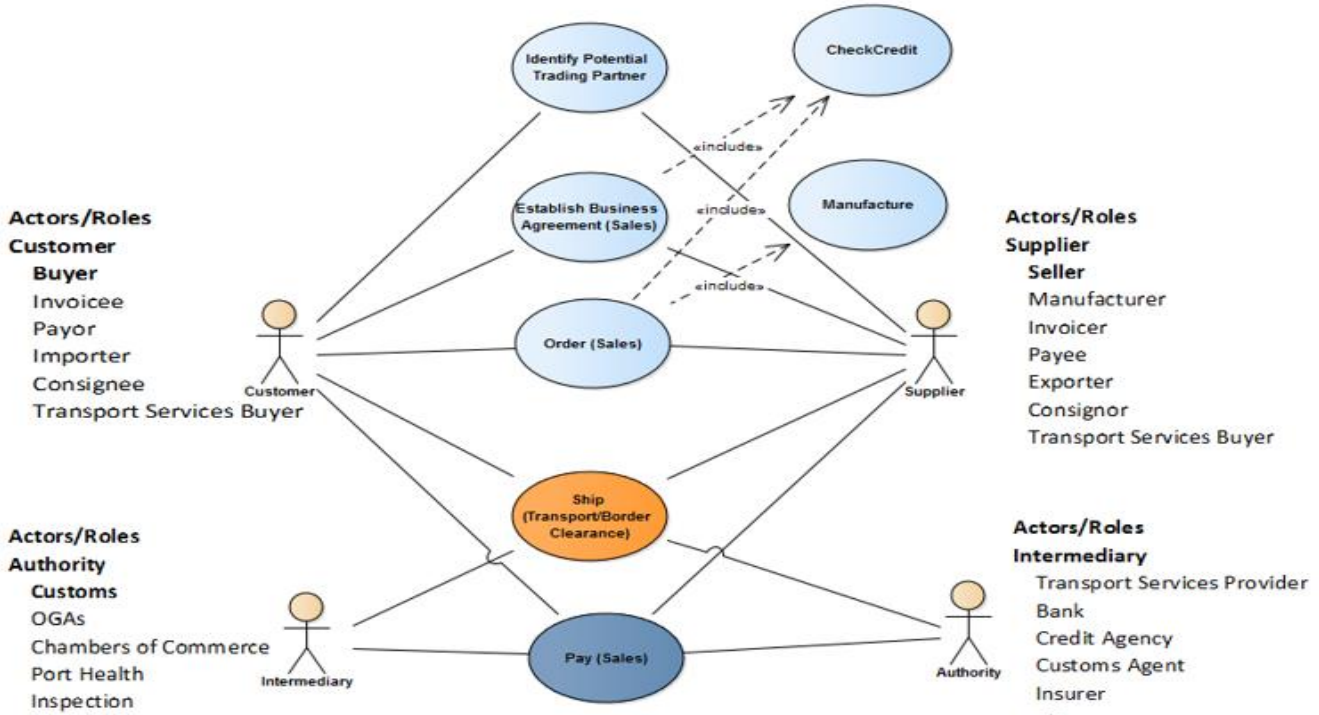
- Most dematerialization projects are only looking at one sectoral view
  - Almost all sectoral views are just one part of a global supply chain
  - The international supply chain is very complex (multiple actors and multiple relations in data exchanges)
- A holistic view and approach are needed
  -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

Basis for Semantic Interoperability

Agreed and Harmonised

- Party and Role Definitions
- Semantic Anchors
- Message Structures
- Contextualised Code Subsets
- Contextualised Business Rules

The actors



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

Aligned with WCO Data Model Concepts

Template: Business Requirements Specification

UNITED NATIONS ECONOMIC COMMISSION FOR EUROPE

UNITED NATIONS CENTRE FOR TRADE FACILITATION
AND ELECTRONIC BUSINESS (UN/CEFACT

BUSINESS REQUIREMENTS SPECIFICATION

(BRS)

Documentation Template

Approved: UN/CEFACT Bureau _____

Version: 2.0

Release: 1.0

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.

Overview of BRS Development Process (Cont…)

- 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.

Example Cross Industry Invoice BRS - 1

TABLE OF CONTENTS

Example Cross Industry Invoice BRS - 2

4. Scope

This section describes the extent and limits of the business process within the supply chain being described in this document.

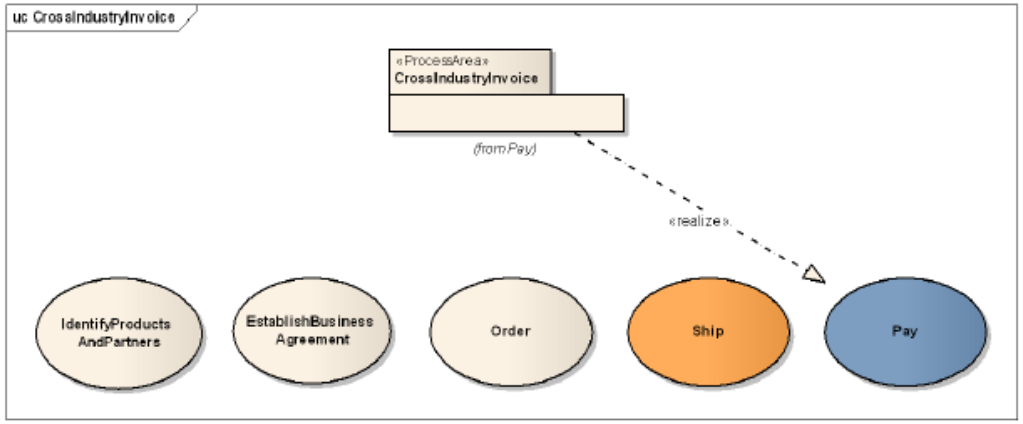


Figure 4-1 Positioning the Invoice in BUY-SHIP-PAY model

Categories	Description and Values
Business Process	Invoice process in the supply chain BUY-SHIP-PAY/Procurement&Sales/Invoice
Product Classification	All
Industry Classification	All
Geopolitical	Global
Official Constraint	None
Business Process Role	Customer and Supplier
Supporting Role	ShipTo, ShipFrom, Consignor, Consignee, Customer"s Accountant, Seller, etc.
System Capabilities	No limitations

Example Cross Industry Invoice BRS - 3

5.1. Business Process Elaboration

5.1.1. Traditional or supplier initiated invoice (Business Process)

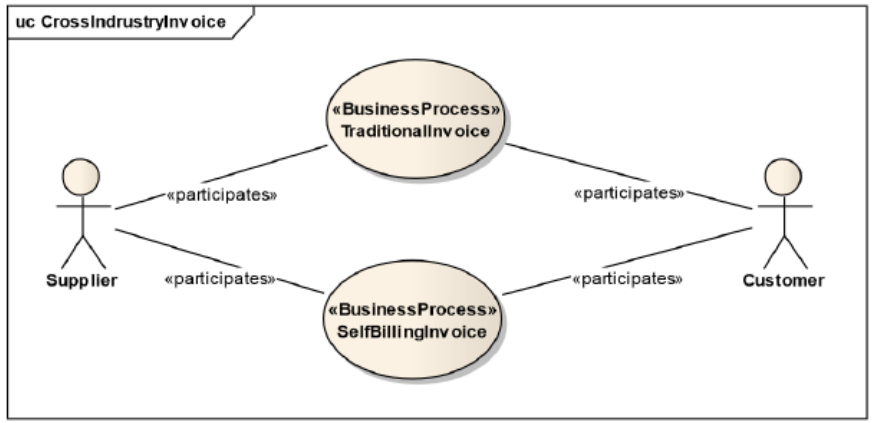


Figure 5-1 Business Process Use Case Diagram

Table 5-1 Business Process Use Case Description

Business process name	Traditional or supplier initiated invoice
Identifier	Cross industry traditional invoice
Actors	Customer, Supplier (Optional, additional roles – Invoicee, Invoice issuer, Customer Accountant, Supplier Accountant)
Pre-conditions	Framework Agreement or Contract and that an order is in place with agreed prices. The supplier has provided goods or services according to the conditions set in the contract, agreement or order. The customer has received the goods or services.
Description	The supplier presents to the customer, for the ordered or delivered, received or consumed goods or services, a detailed statement of trade account payable (invoice). The customer reconciles the invoice with the agreed prices and the goods or services rendered and initiates the payment remittance.
Post-conditions	Based on the reconciled invoices, the customer should issue the notification for the payments. For the incorrect invoices, the customer will generate a dispute notice to the supplier.

Example Cross Industry Invoice BRS - 4

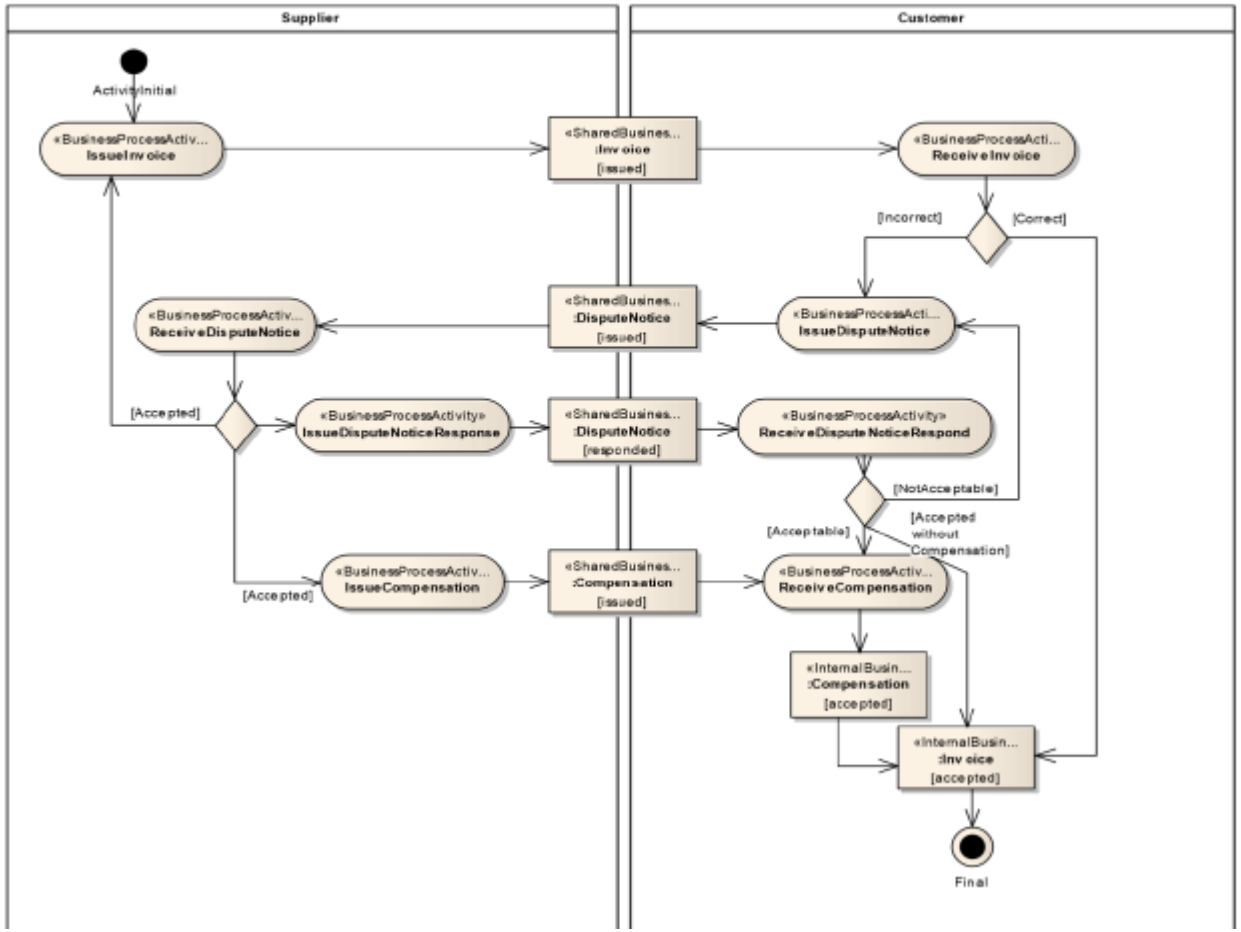


Figure 5-2 Business Process Activity Diagram

Example Cross Industry Invoice BRS - 5

5.1.1.1. Traditional Invoice (Business Collaboration)

TraditionalInvoice – *(BusinessCollaboration Use Case diagram)*

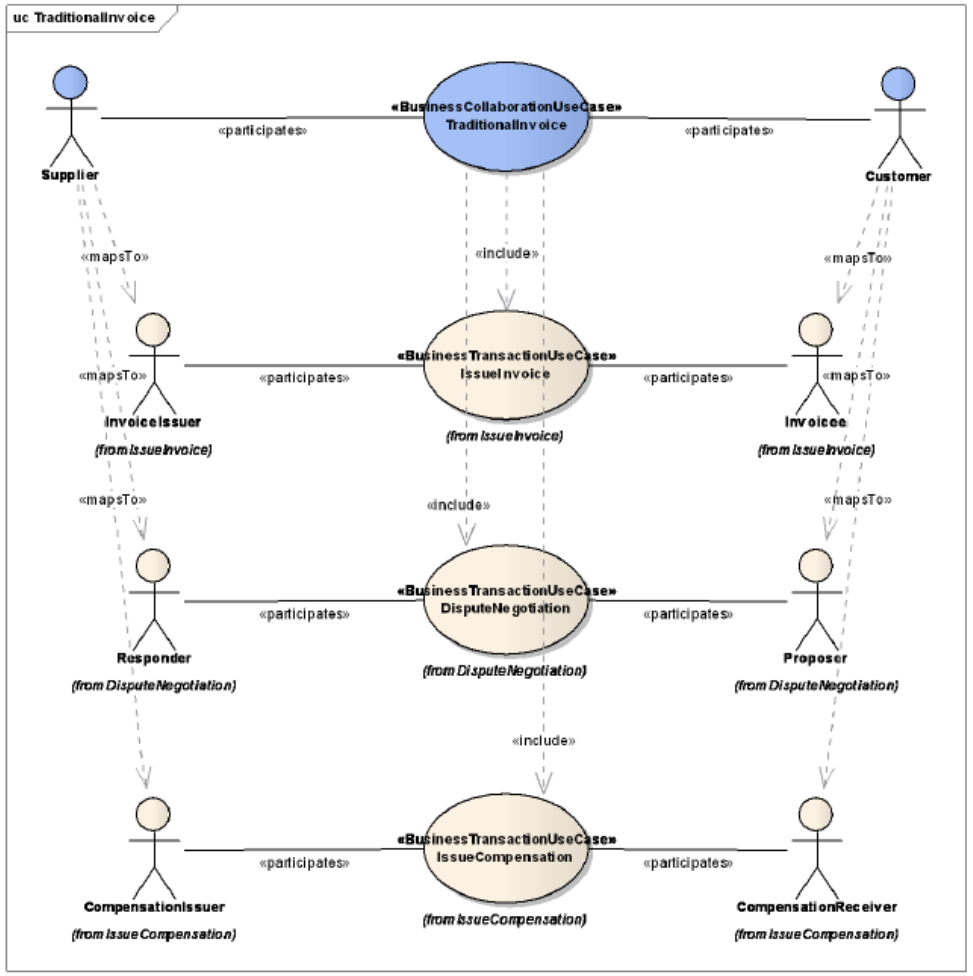
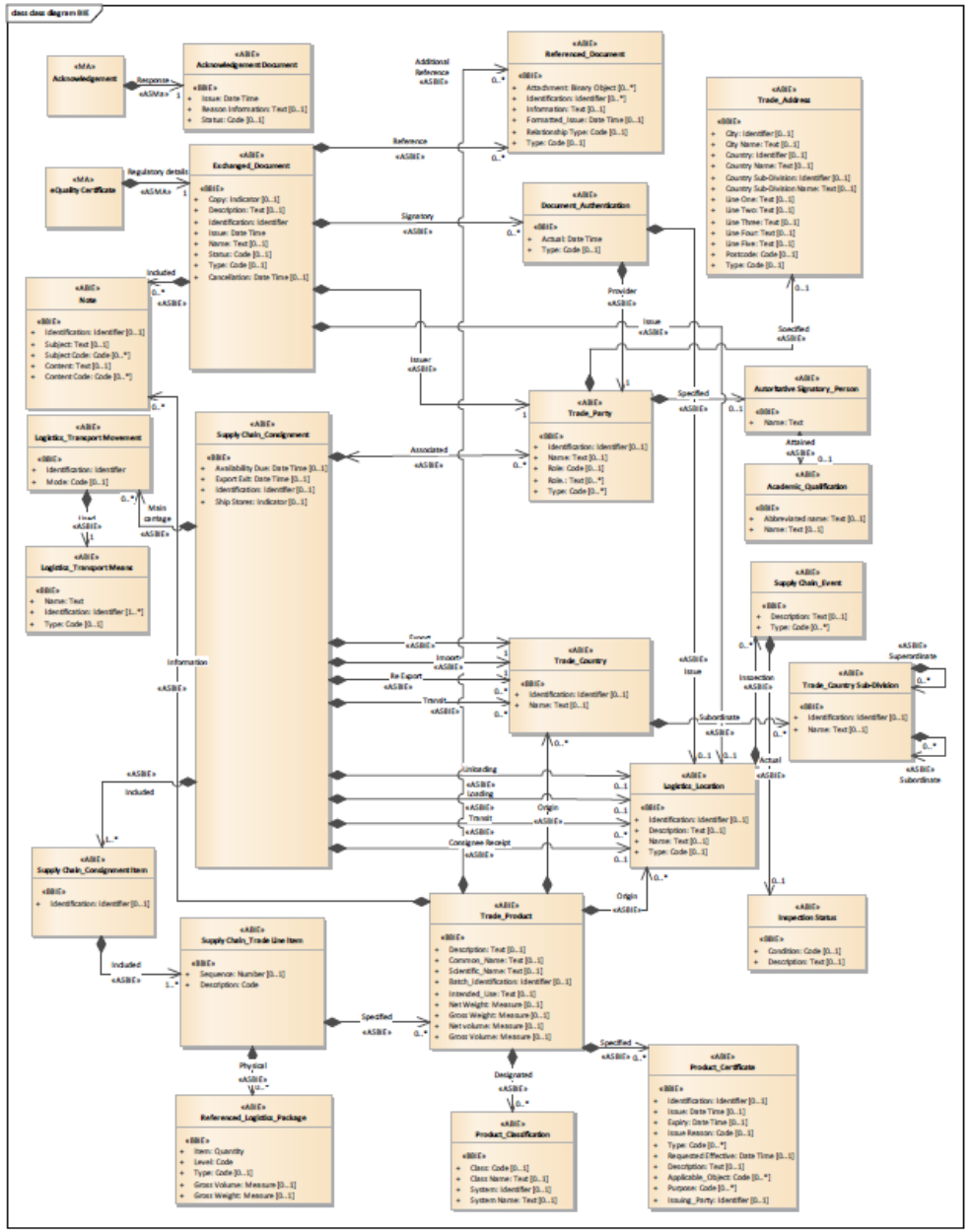


Figure 5-3 Business Collaboration Use Case Diagram

Example eQuality BRS - 6



UN/CEFACT Business Standards Deliverables

1: Business Requirements Specification (BRS) including

2: Business Information Entity Discovery

3: CCL submission (as needed)

4: CCBDA subset of Reference Data Model

5: Technical Artefacts production

UN/CEFACT evolution/revolution – Reference Data Models

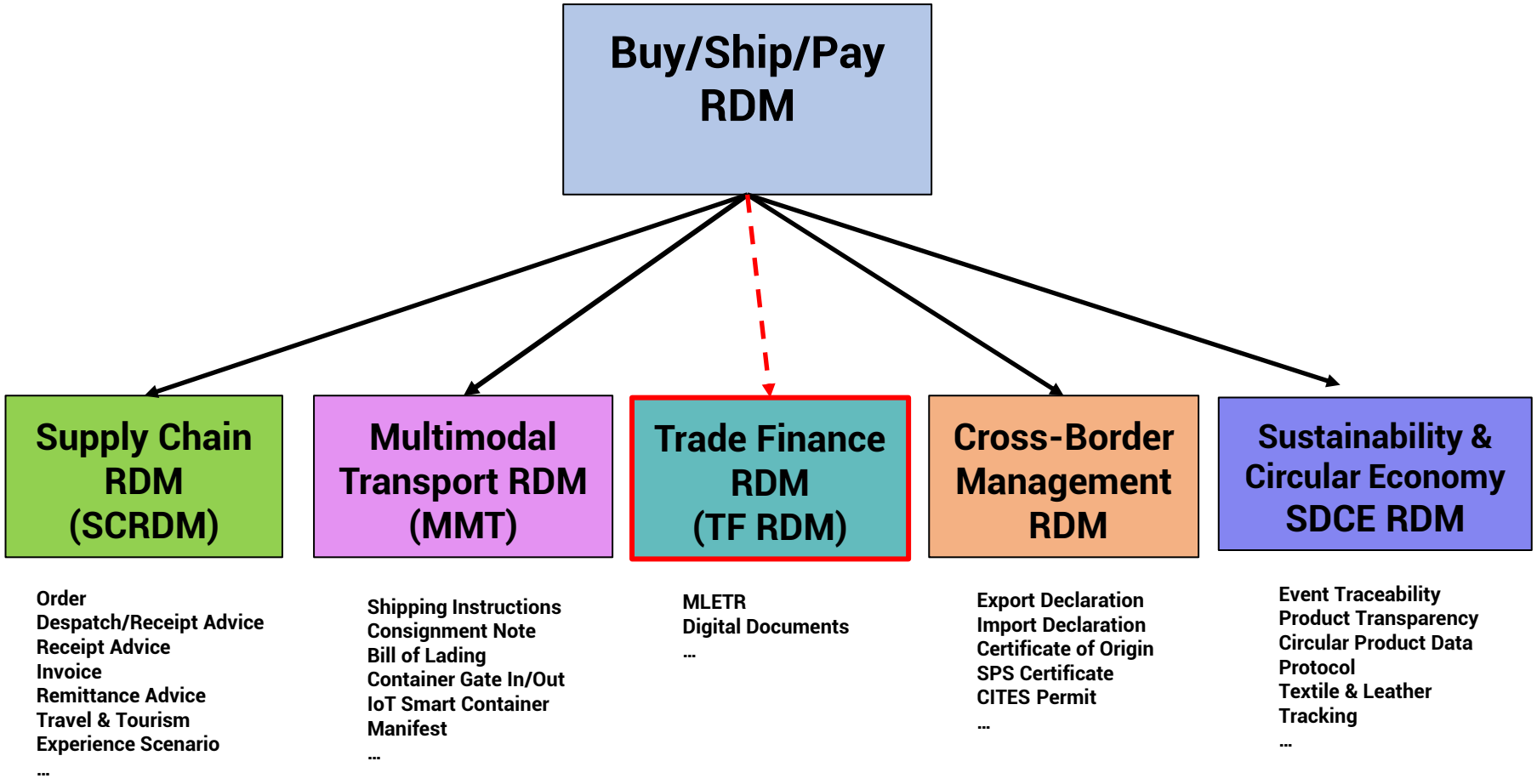
Benefits of UN/CEFACT Semantic Models

- 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)

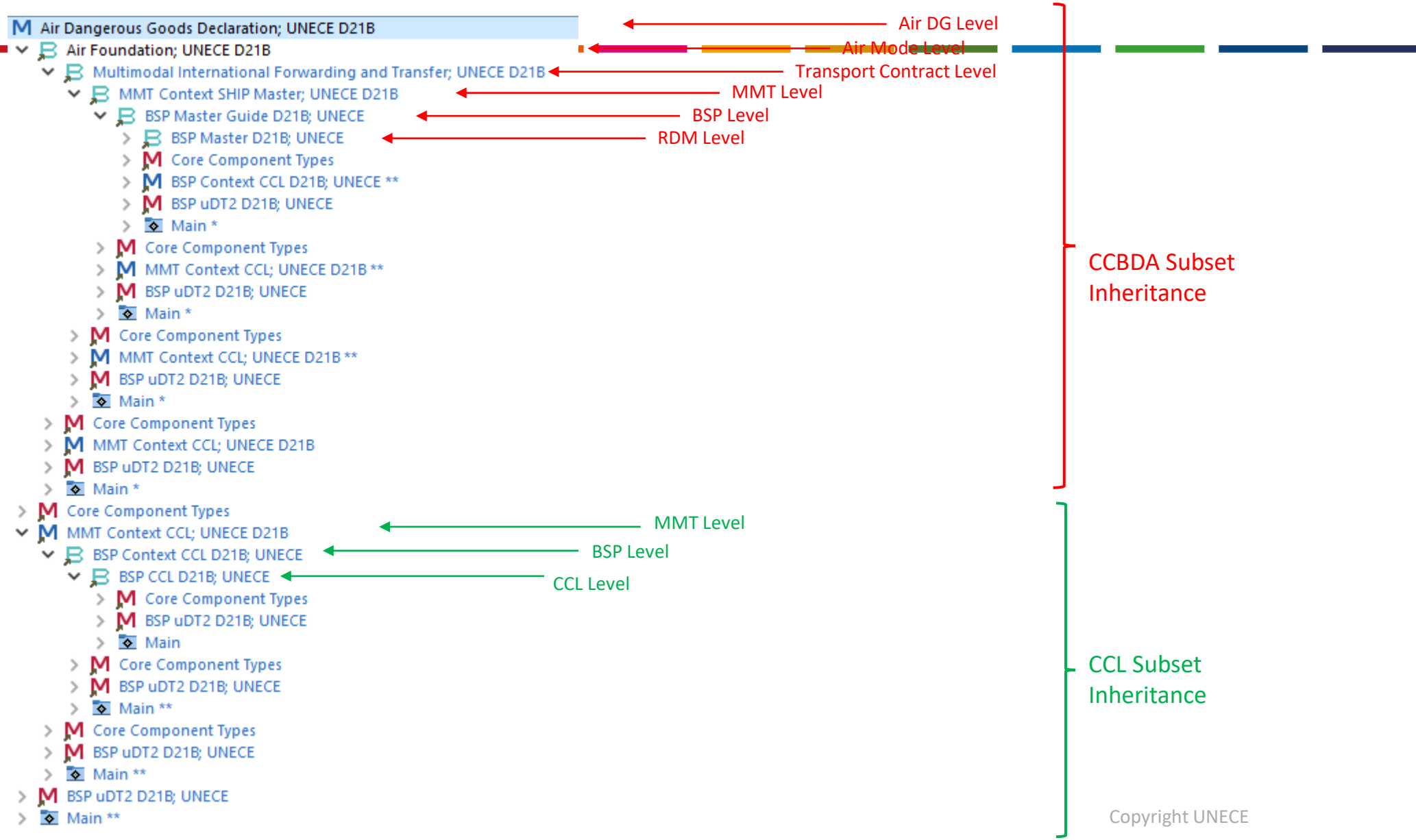
UN/CEFACT Global Supply Chain eBusiness Standards

- Based on the UNCCL (Core Component Library)
- Cross-industry and Multi Modal/Intermodal
- Result of contributions from 100s of global supply chain and transport & logistics experts over 20 years
- 130+ Business Process Analyses and Data Exchange Message structures
- Latest published versions D22B
- Publication formats html/UML, profile xsd and future JSON schema to support UN/CEFACT standardised APIs and harmonised JSON-LD API developments
- Included references to UNTDED and UN/EDIFACT to support backwards compatibility and to encourage migration
- Aligned to international regulations and conventions where applicable

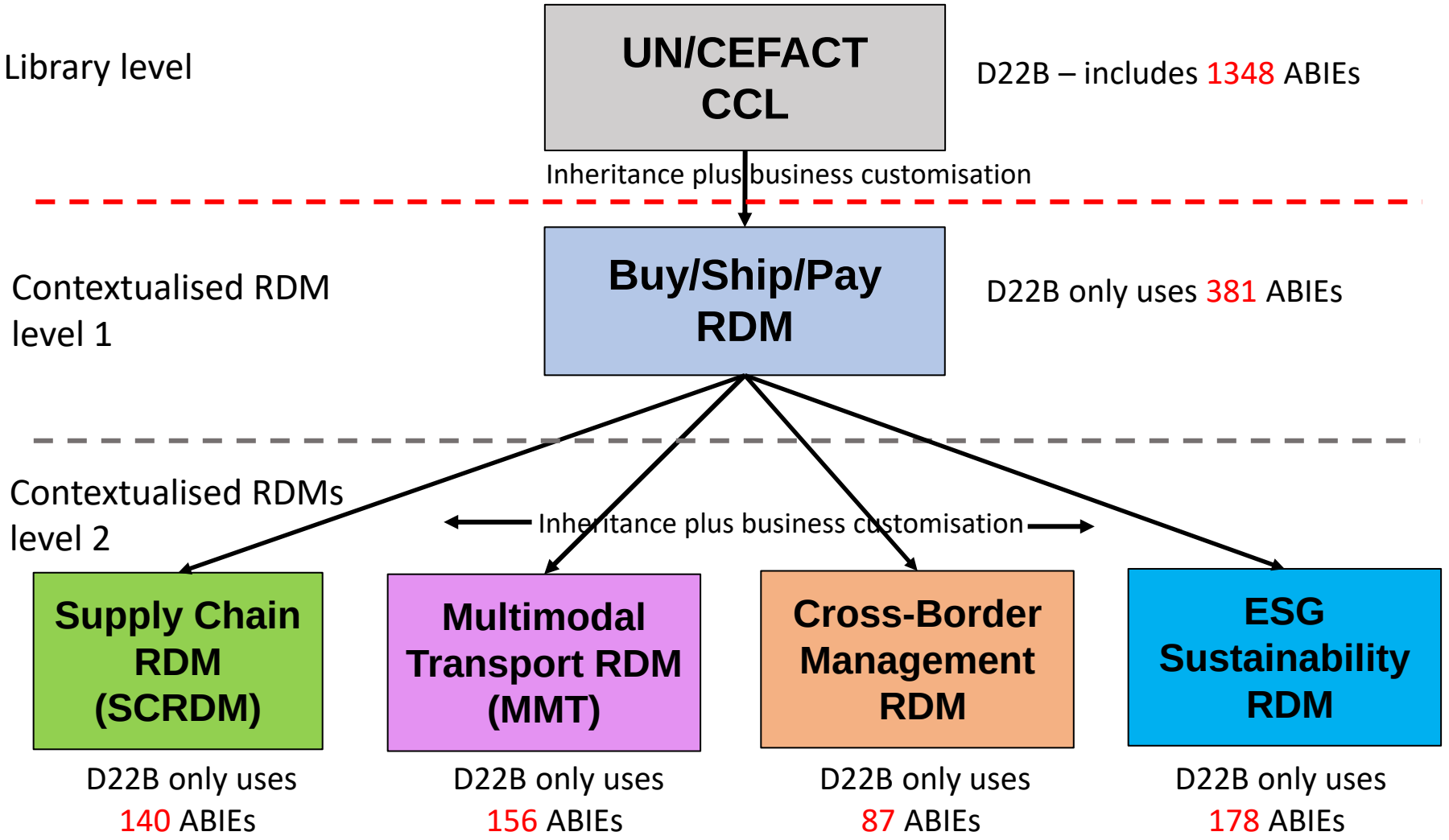
UN/CEFACT Reference Data Model Family



UN/CEFACT RDM Inheritance Levels



UN/CEFACT International Supply Chain Reference Data Model Family



CoreComponent→ABIE contextualisations

Example Person Core Component

80 Attributes

27 Associations incl.

- A Alternate Language Code
- A Alternate Language Proficiency Code
- A Director Or Officer Indicator
- A Social Insurance Eligibility Indicator
- A Social Insurance Contract ID
- A Medicare Qualified Indicator
- A Social Security Number Release Authorization C
- A Tax Filing Status Code
- A Affiliate Privacy Response Code
- A Third Party Privacy Response Code
- A Disablement Registration Date Time
- A Role Text
- A Attends School Indicator
- A College Grade Average
- A School Disciplinary Action Indicator
- A Highest Grade Completed Text
- A High School Grade Average Text
- A College Grade Average Value
- A Category Code
- A Role Code
- A In Transit Indicator
- C Residence Address
- C Nationality Country
- C Telephone
- C Fax
- C URI
- C Information Address

17 reuses as

Business Information Entities

- C Main/ABIE/AAA Chart Of Accounts_Person. Details
- C Main/ABIE/AAA Journal_Person. Details
- C Main/ABIE/AAA Report_Person. Details
- C Main/ABIE/AAA Wrap_Person. Details
- C Main/ABIE/Authoritative Signatory_Person. Details
- C Main/ABIE/Contact_Person. Details
- C Main/ABIE/Guest_Person. Details
- C Main/ABIE/Inspection_Person. Details
- C Main/ABIE/Operator_Person. Details
- C Main/ABIE/Payment_Person. Details
- C Main/ABIE/Project_Person. Details
- C Main/ABIE/Representative_Person. Details
- C Main/ABIE/Reserving_Person. Details
- C Main/ABIE/Responsible_Person. Details
- C Main/ABIE/SPS_Person. Details
- C Main/ABIE/TMW_Person. Details
- C Main/ABIE/Transport_Person. Details

Reuse example:

Transport Person for IMO FAL

- C Transport Person
  - C Based on "Person"
  - A ID
  - A Name
  - A Birth Date Time
  - A Language Code
  - A Role Text
  - A Role Code
  - A Category Code
  - A Gender Code
  - A Given Name
  - A Family Name
  - A Birth Country Code
  - A Birthplace Name
  - A In Transit Indicator
  - C Nationality Country
  - C Certified Accreditation
  - C Attained Qualification
  - C Embarkation Location
  - C Disembarkation Location
  - C Travel Identity Document
  - C Travel Visa Document
  - C Crew Travel Effects
  - C Landline Telephone
  - C Mobile Telephone
  - C Email Address

RDM Data Exchange Structure Relationships

- C Buy Ship Pay Master **
  - C Exchanged Document Context
  - C Exchanged Document
  - C Exchanged Declaration
  - C Logistics Transport Movement
  - C Supply Chain Consignment
  - C Logistics Transport Equipment
  - C Transport Service
  - C Trade Settlement Payment
  - C Supply Chain Trade Transaction
  - C Valuation Breakdown Statement
  - C Financing Request Document
  - C Financing Summary

Exchange Header

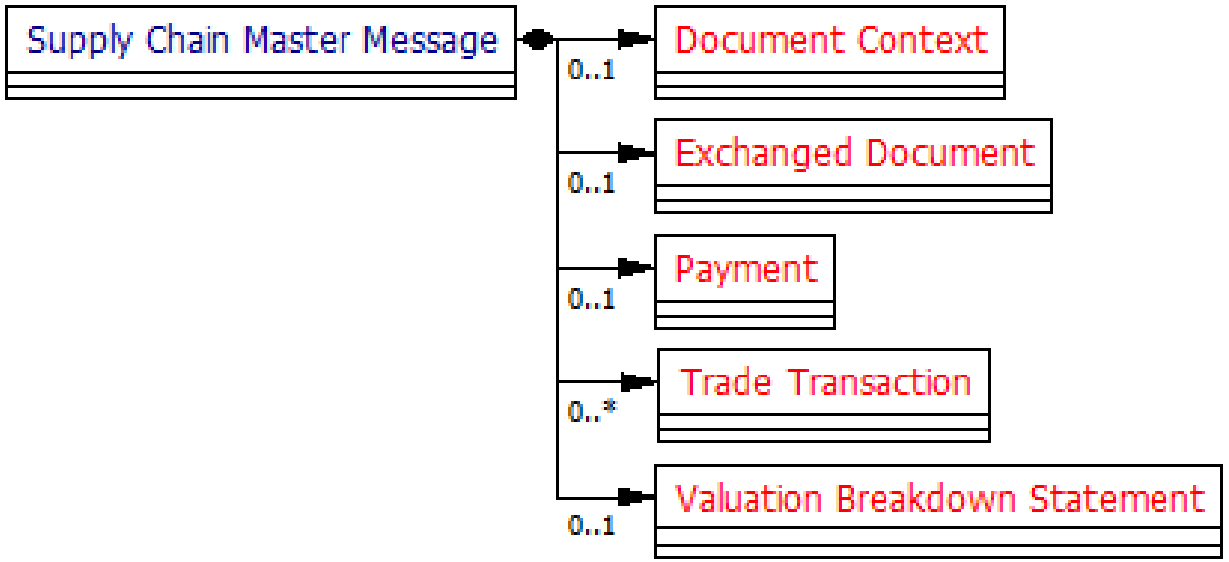
Regulatory Header

SHIP

BUY

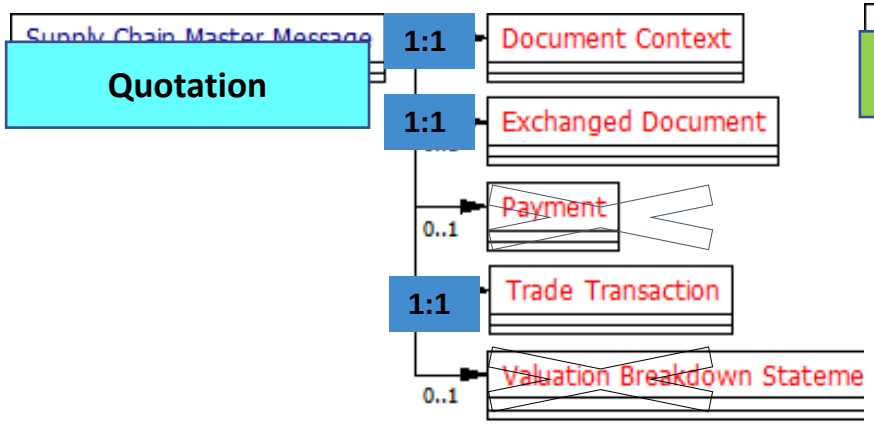
PAY

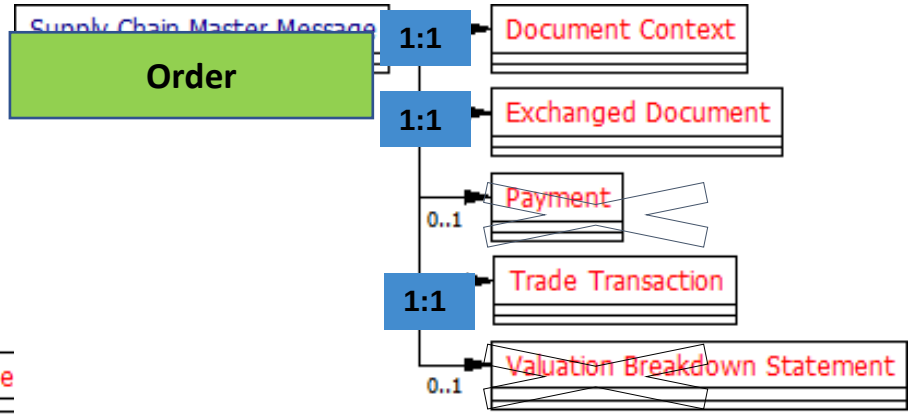
Supply Chain (SCRDM) Master Message Structure

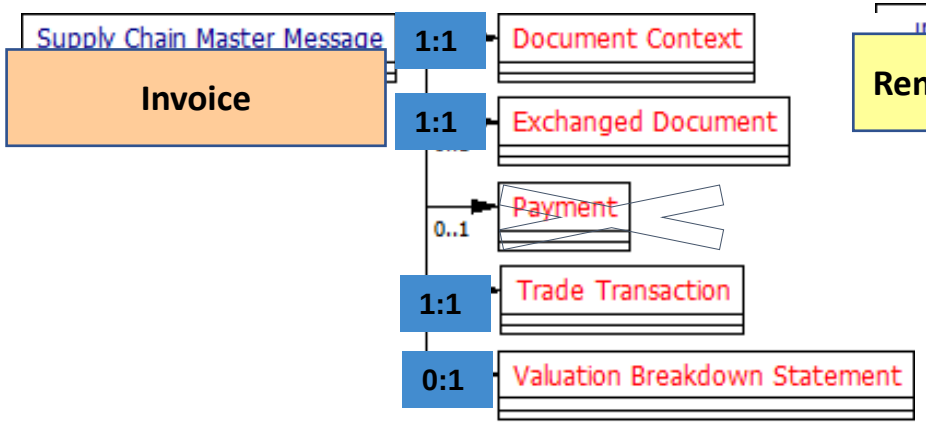


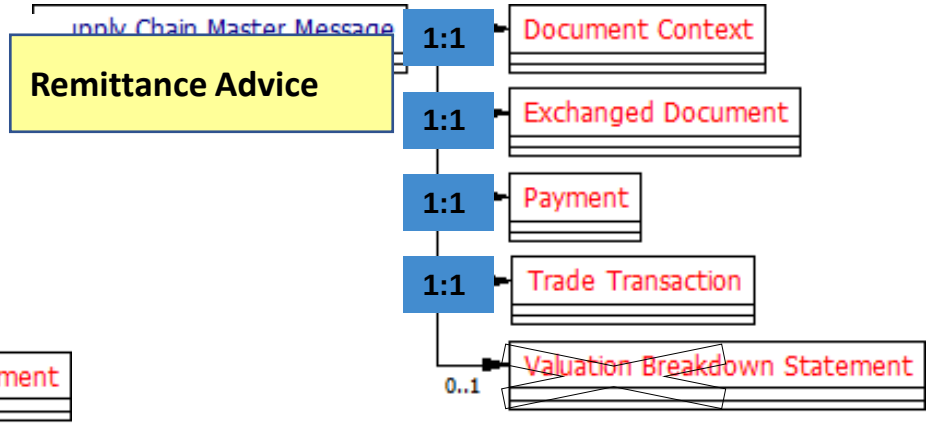
- **Supply Chain Context**
- **Reuses just under 10% of the Reference ABIEs from Core Component Library**
- **Customised set of BSP ABIEs**

Sample Supply Chain CCBDA Subset Data Exchange Structures

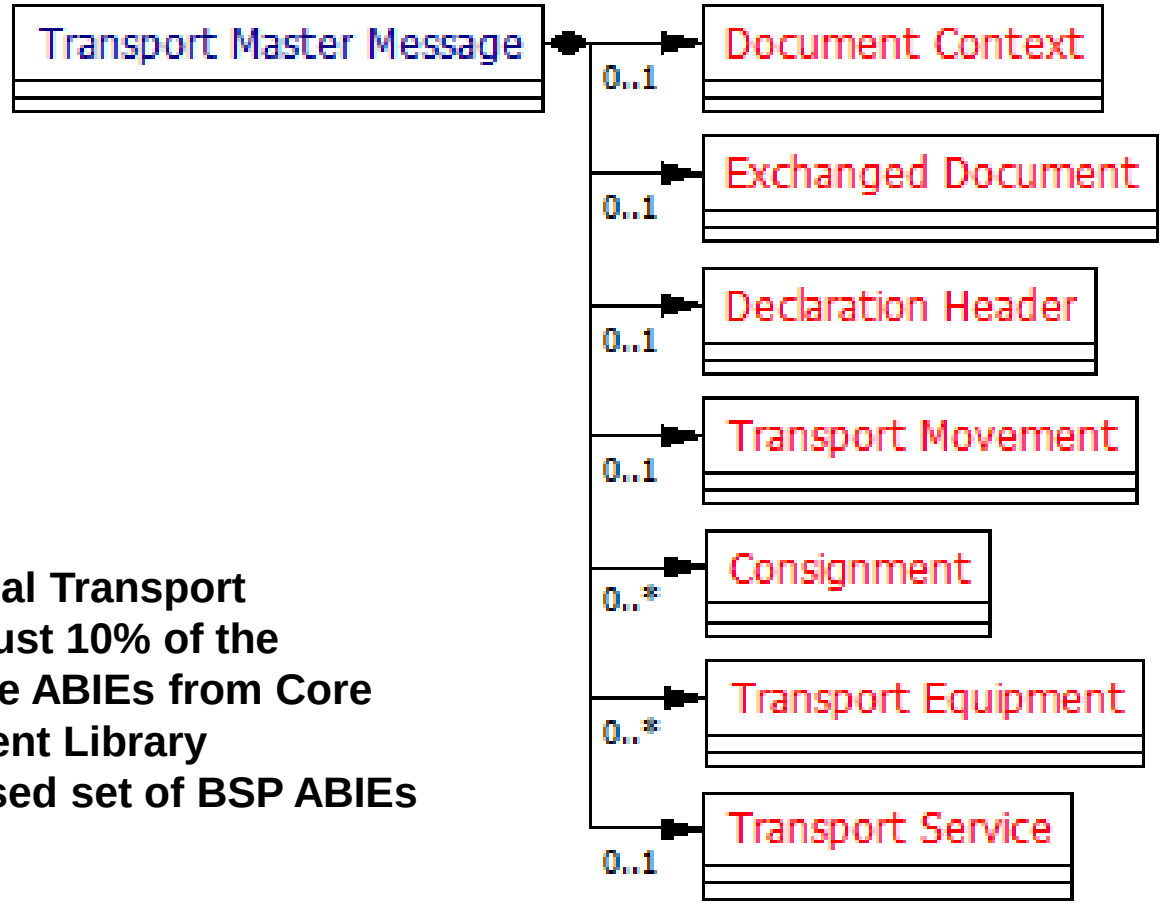








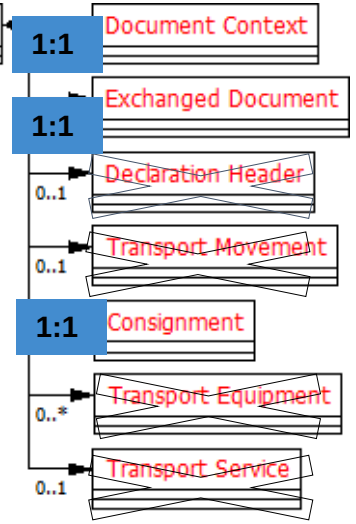
Transport & Logistics (MMTRDM) Master Message Structure



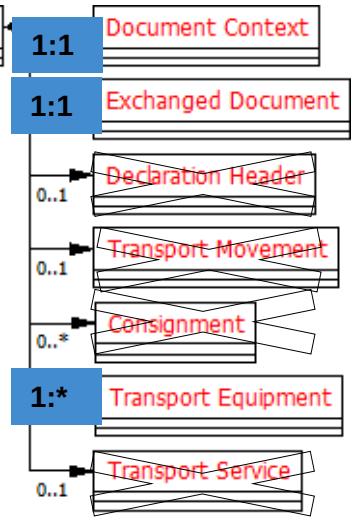
- **MultiModal Transport**
- **Reuses just 10% of the Reference ABIEs from Core Component Library**
- **Customised set of BSP ABIEs**

Sample Transport CCBDA Subset Data Exchange Structures

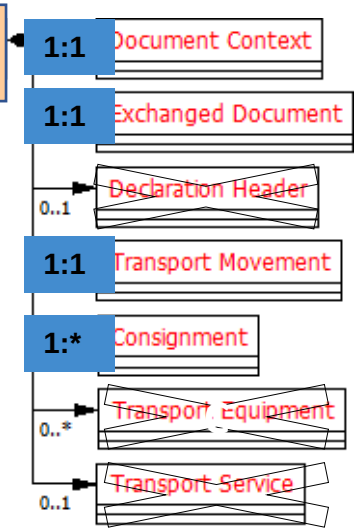
Bill of Lading/ IFTMCS



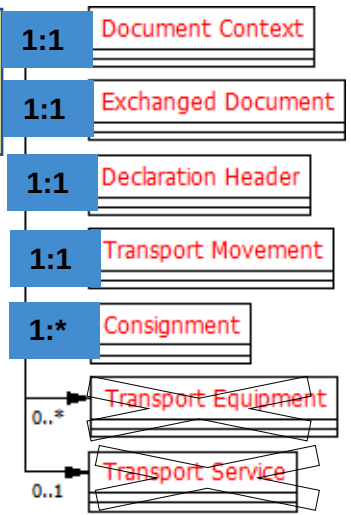
Container BayPlan/ BAPLIE



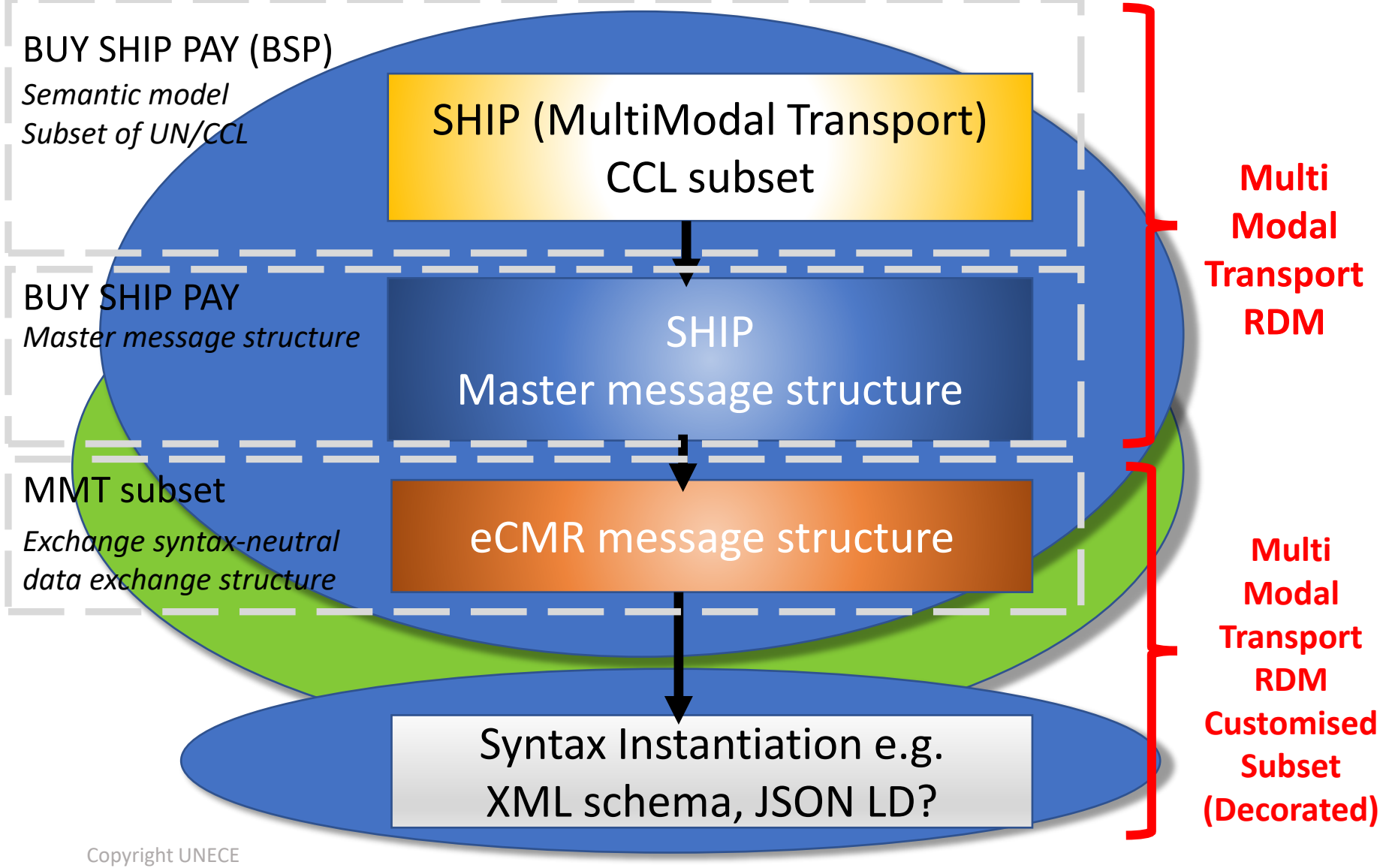
Operational Manifest/ IFCSUM



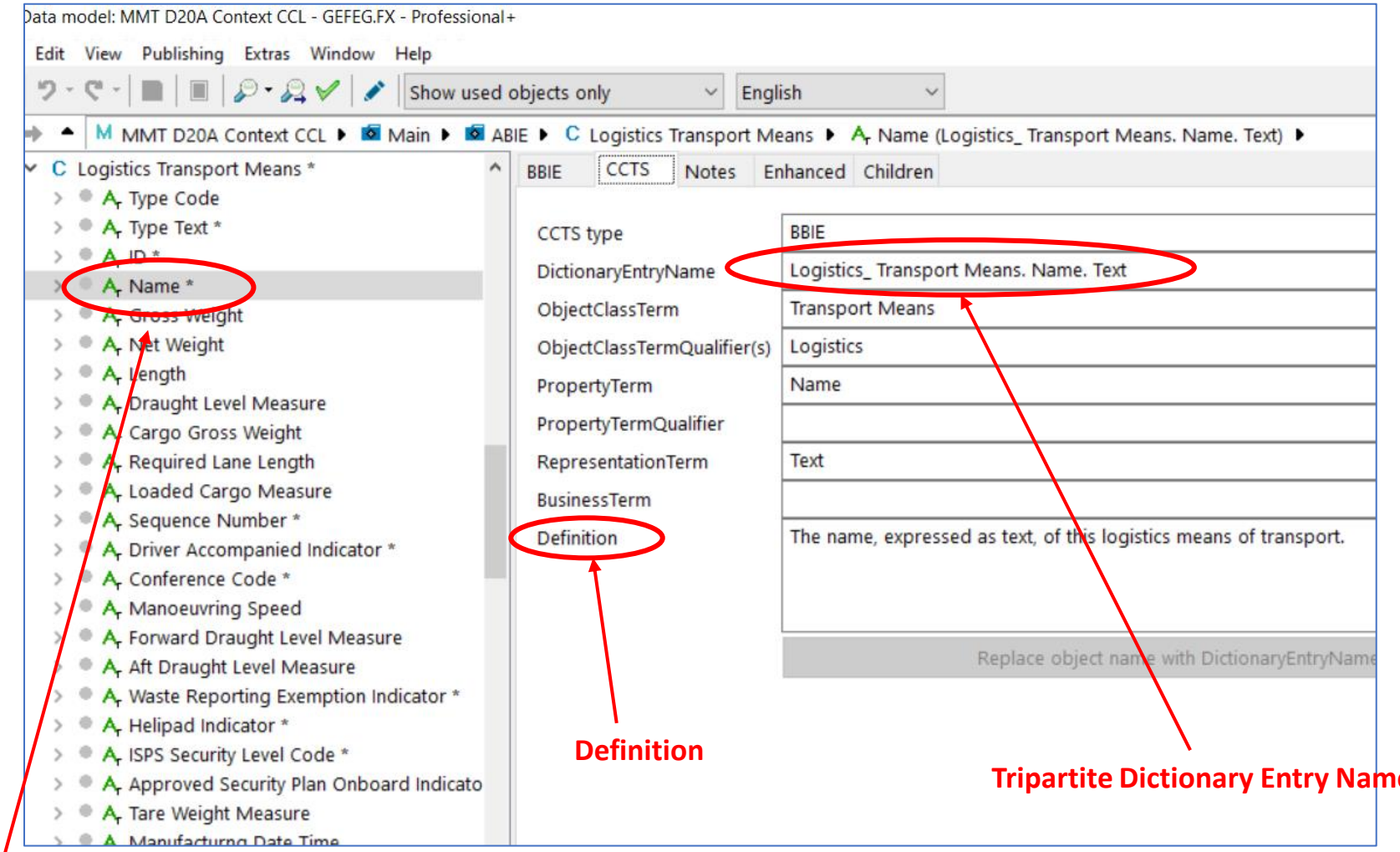
Customs Cargo Report/ CUSDEC/GOVCBR WCO DM Declaration IP



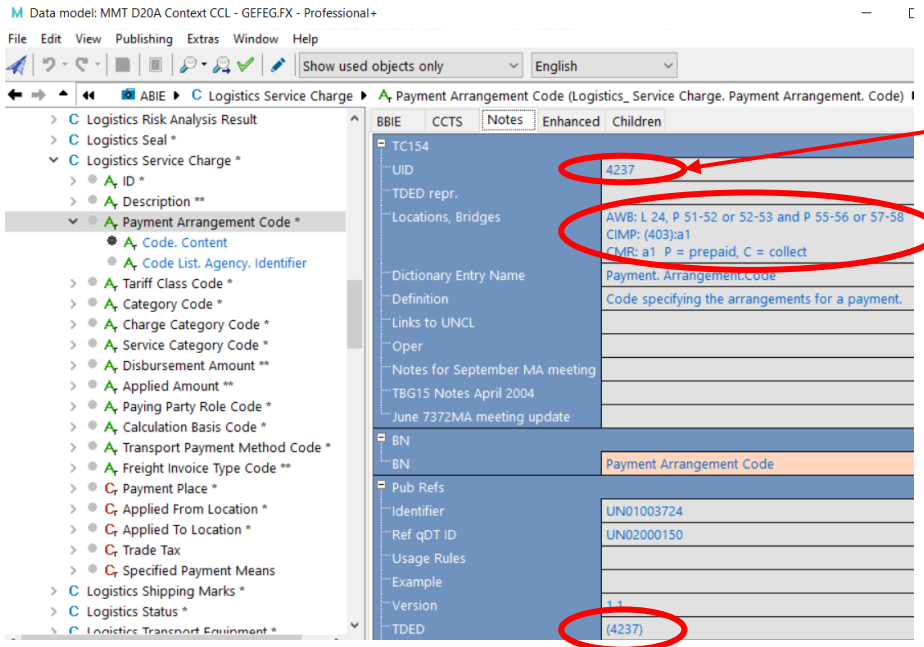
UN/CEFACT Publication Transport Example: electronic Road Consignment Note (eCMR)



Core Component Dictionary Entry Names and Definitions



Built-in mappings to UNTDED, UN Layout Key and UN/EDIFACT

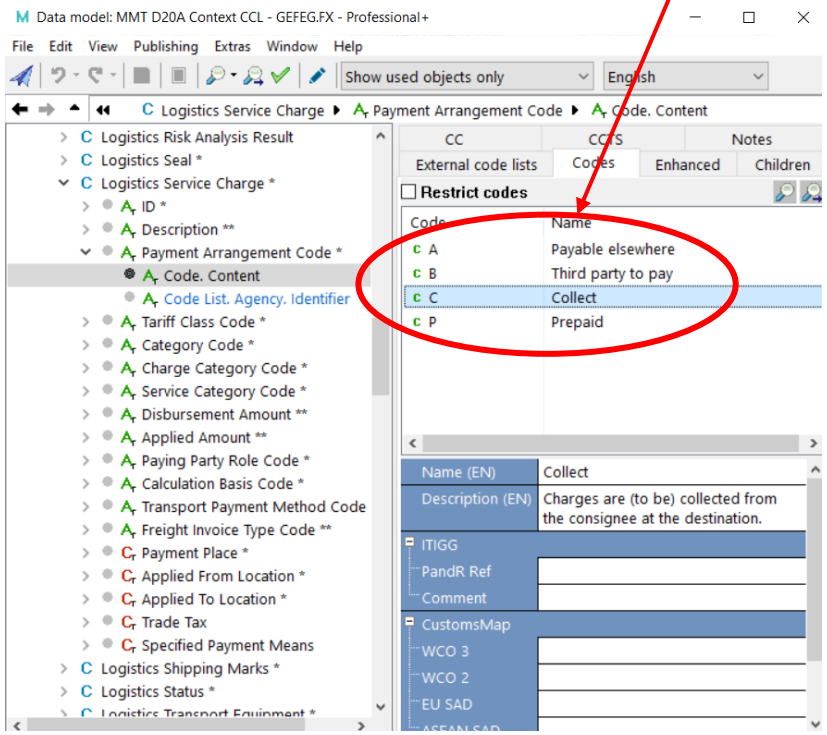


UNTDED

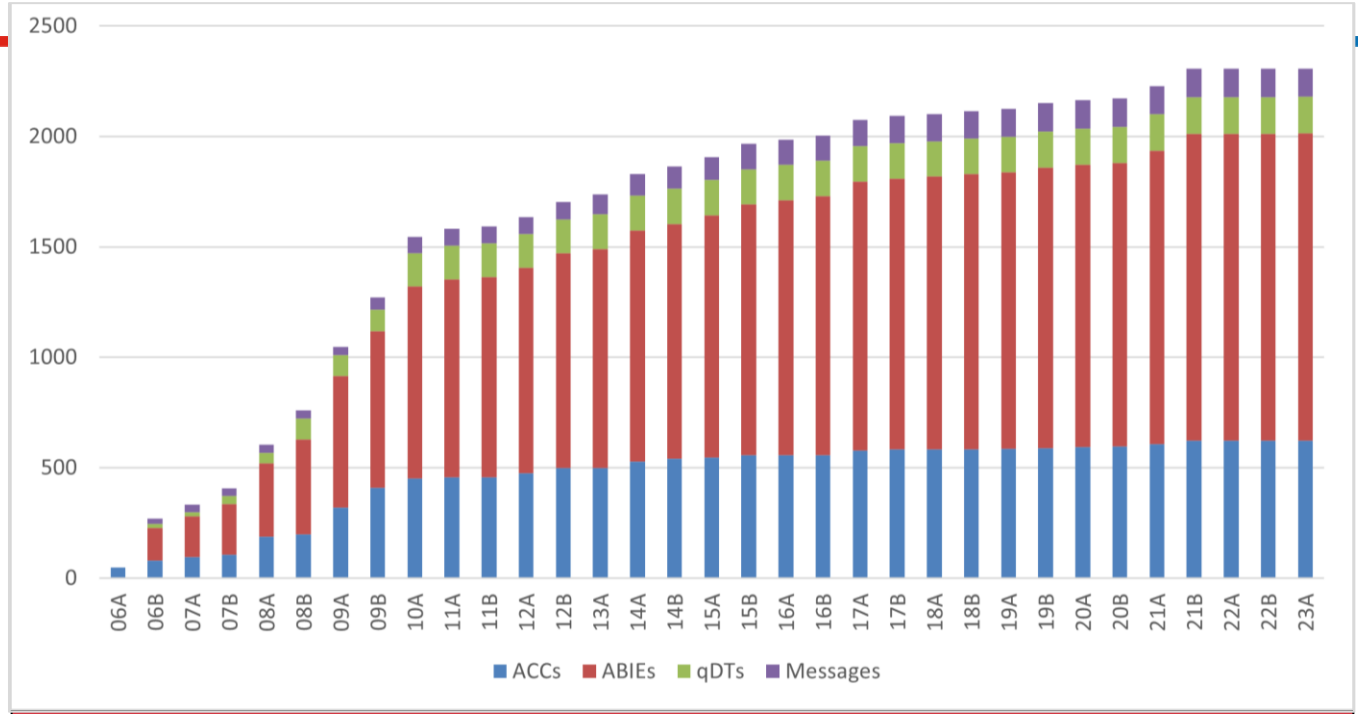
UN Layout Keys

UNTDID
EDIFACT

UNCL Codes



UN/CEFACT Core Component Library



Business Information Entities (BIEs)

Reuses of Object Class Library in different business Contexts

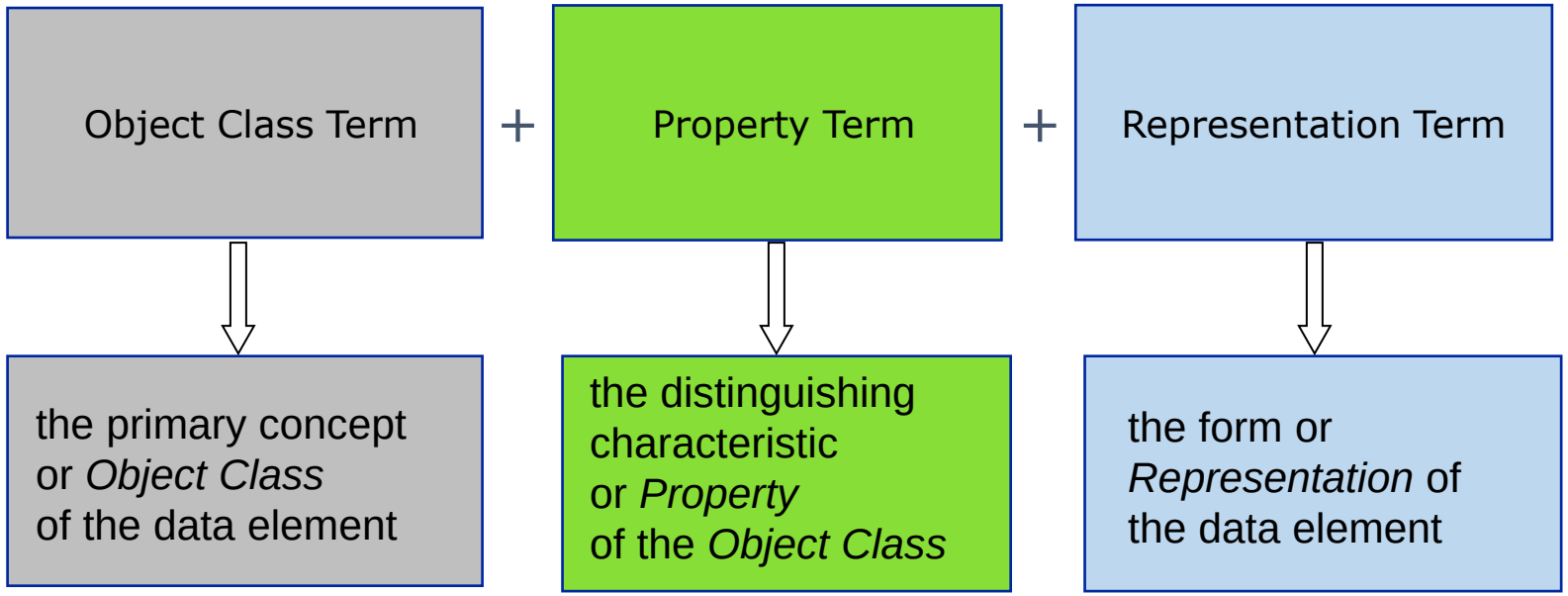
(D23A ~ 1350 BIEs)

Semantic Foundation - Core Component (CCs)

Object Class Library

(D23A ~ 650 CCs)

ISO 11179 Tripartite Data Element Naming



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!)

CCTS Dictionary Entry Names

Object Class (OC)	.	Property Term (PT)	.	Representation Term (RT)

e.g. Document
Address
Event
Product
Process
Person
Country
Transport Means
Payment Terms

e.g. Cost
Delivery
Type
Estimated Arrival
Price
Status
Identification
Time
Volume

e.g. Amount
Code
Date Time
Identifier
Indicator
Measure
Numeric
Percent
Quantity
Text

Examples:

Product. Price. Amount

Document. Status. Code

Address. City Name. Text

Transport Means. Estimated Arrival. Date Time

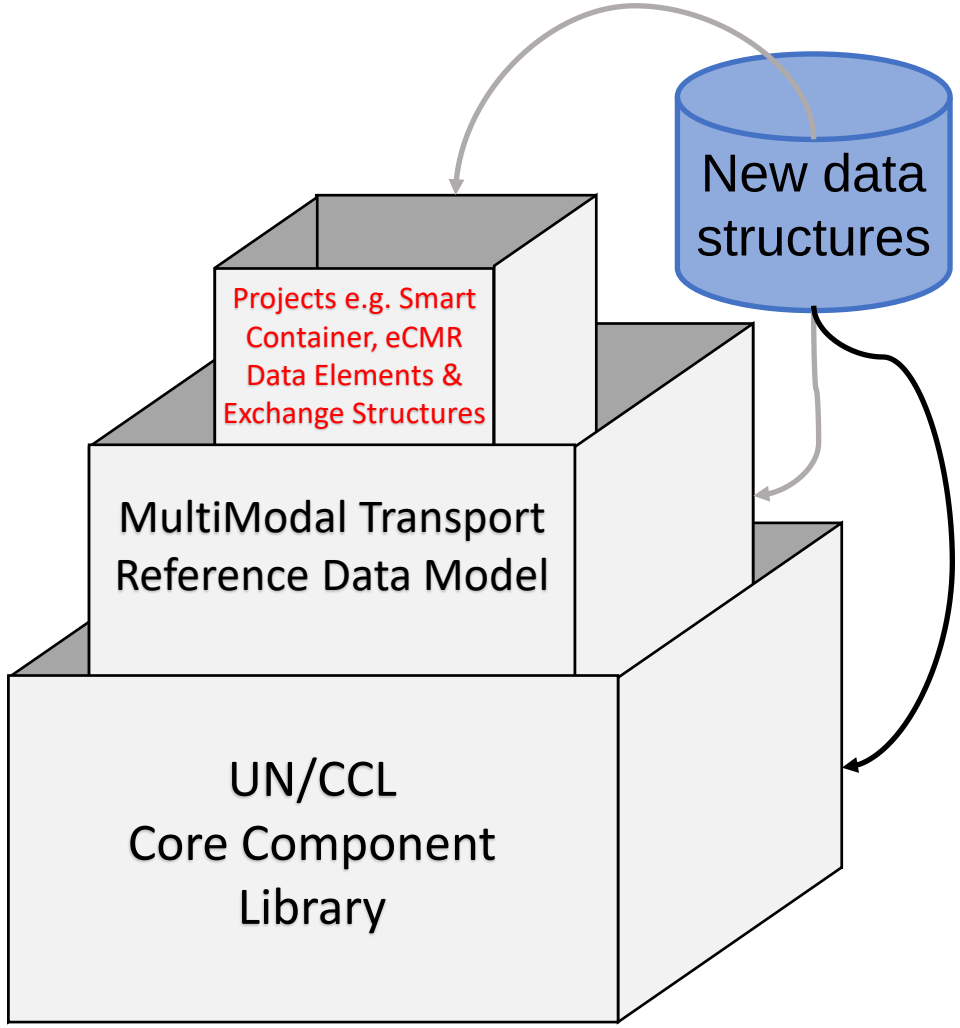
How CCL growth is managed

Library Maintenance Team responsible for

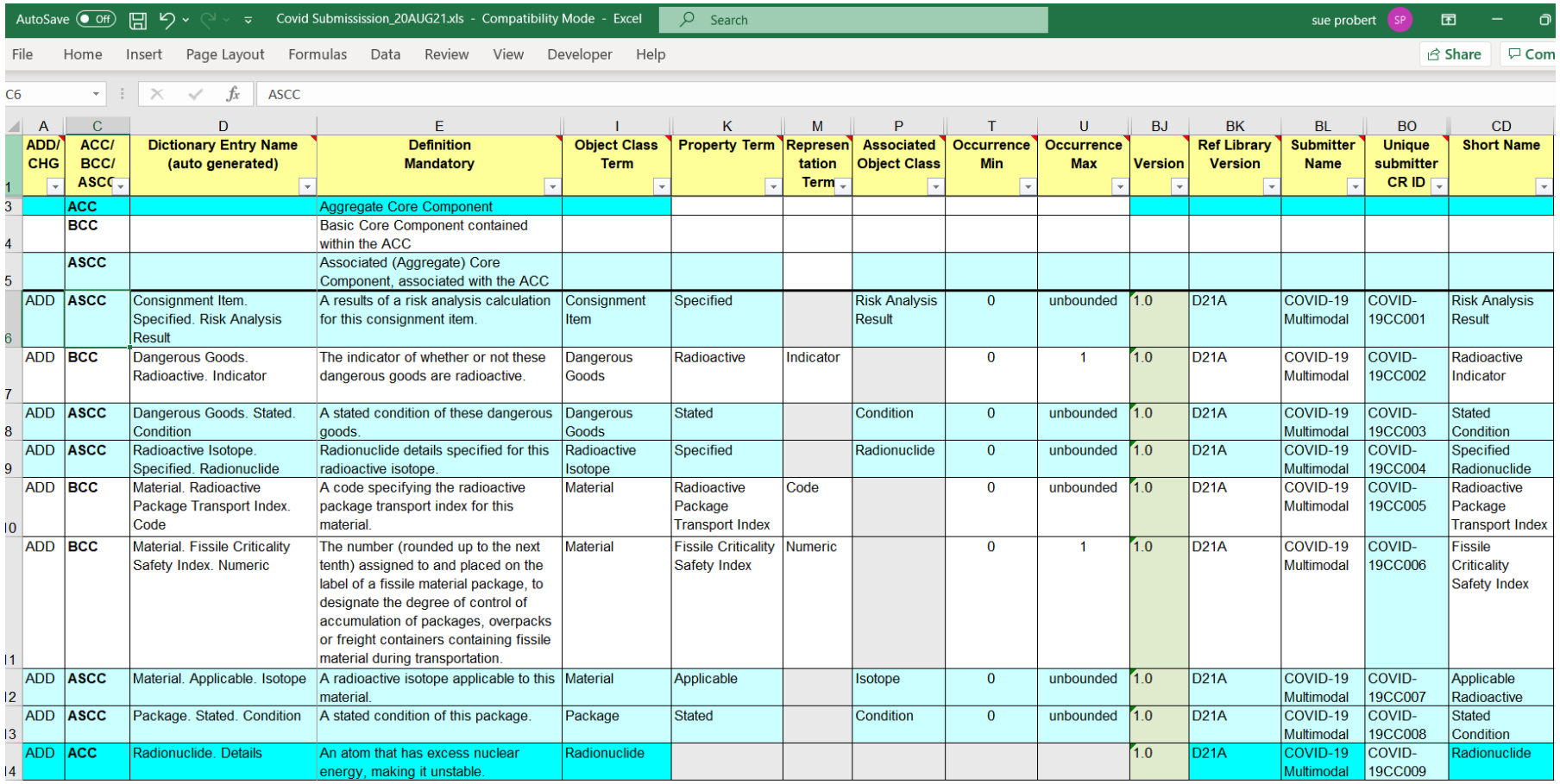
- Cross-Domain Harmonisation

Project Teams responsible for

- Contextualised RDM development, CCL submissions and customised data exchange structures



Example CCL Submission



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C6 | ASCC

	A	C	D	E	I	K	M	P	T	U	BJ	BK	BL	BO	CD
1	ADD/ CHG	ACC/ BCC/ ASCC	Dictionary Entry Name (auto generated)	Definition Mandatory	Object Class Term	Property Term	Representation Term	Associated Object Class	Occurrence Min	Occurrence Max	Version	Ref Library Version	Submitter Name	Unique submitter CR ID	Short Name
3		ACC		Aggregate Core Component											
4		BCC		Basic Core Component contained within the ACC											
5		ASCC		Associated (Aggregate) Core Component, associated with the ACC											
6	ADD	ASCC	Consignment Item. Specified. Risk Analysis Result	A results of a risk analysis calculation for this consignment item.	Consignment Item	Specified		Risk Analysis Result	0	unbounded	1.0	D21A	COVID-19 Multimodal	COVID-19CC001	Risk Analysis Result
7	ADD	BCC	Dangerous Goods. Radioactive. Indicator	The indicator of whether or not these dangerous goods are radioactive.	Dangerous Goods	Radioactive	Indicator		0	1	1.0	D21A	COVID-19 Multimodal	COVID-19CC002	Radioactive Indicator
8	ADD	ASCC	Dangerous Goods. Stated. Condition	A stated condition of these dangerous goods.	Dangerous Goods	Stated		Condition	0	unbounded	1.0	D21A	COVID-19 Multimodal	COVID-19CC003	Stated Condition
9	ADD	ASCC	Radioactive Isotope. Specified. Radionuclide	Radionuclide details specified for this radioactive isotope.	Radioactive Isotope	Specified		Radionuclide	0	unbounded	1.0	D21A	COVID-19 Multimodal	COVID-19CC004	Specified Radionuclide
10	ADD	BCC	Material. Radioactive Package Transport Index. Code	A code specifying the radioactive package transport index for this material.	Material	Radioactive Package Transport Index	Code		0	unbounded	1.0	D21A	COVID-19 Multimodal	COVID-19CC005	Radioactive Package Transport Index
11	ADD	BCC	Material. Fissile Criticality Safety Index. Numeric	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.	Material	Fissile Criticality Safety Index	Numeric		0	1	1.0	D21A	COVID-19 Multimodal	COVID-19CC006	Fissile Criticality Safety Index
12	ADD	ASCC	Material. Applicable. Isotope	A radioactive isotope applicable to this material.	Material	Applicable		Isotope	0	unbounded	1.0	D21A	COVID-19 Multimodal	COVID-19CC007	Applicable Radioactive
13	ADD	ASCC	Package. Stated. Condition	A stated condition of this package.	Package	Stated		Condition	0	unbounded	1.0	D21A	COVID-19 Multimodal	COVID-19CC008	Stated Condition
14	ADD	ACC	Radionuclide. Details	An atom that has excess nuclear energy, making it unstable.	Radionuclide						1.0	D21A	COVID-19 Multimodal	COVID-19CC009	Radionuclide

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

Example Business Standard Streamlined Publications 1

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

RDM Artefacts

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

CCBDA Subset Business Standards

Based on MMT RDM

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

RDM Artefacts

Business Standard CCBDA MMT Subset Artefacts

Thank you!

Sue Probert (Chair)
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