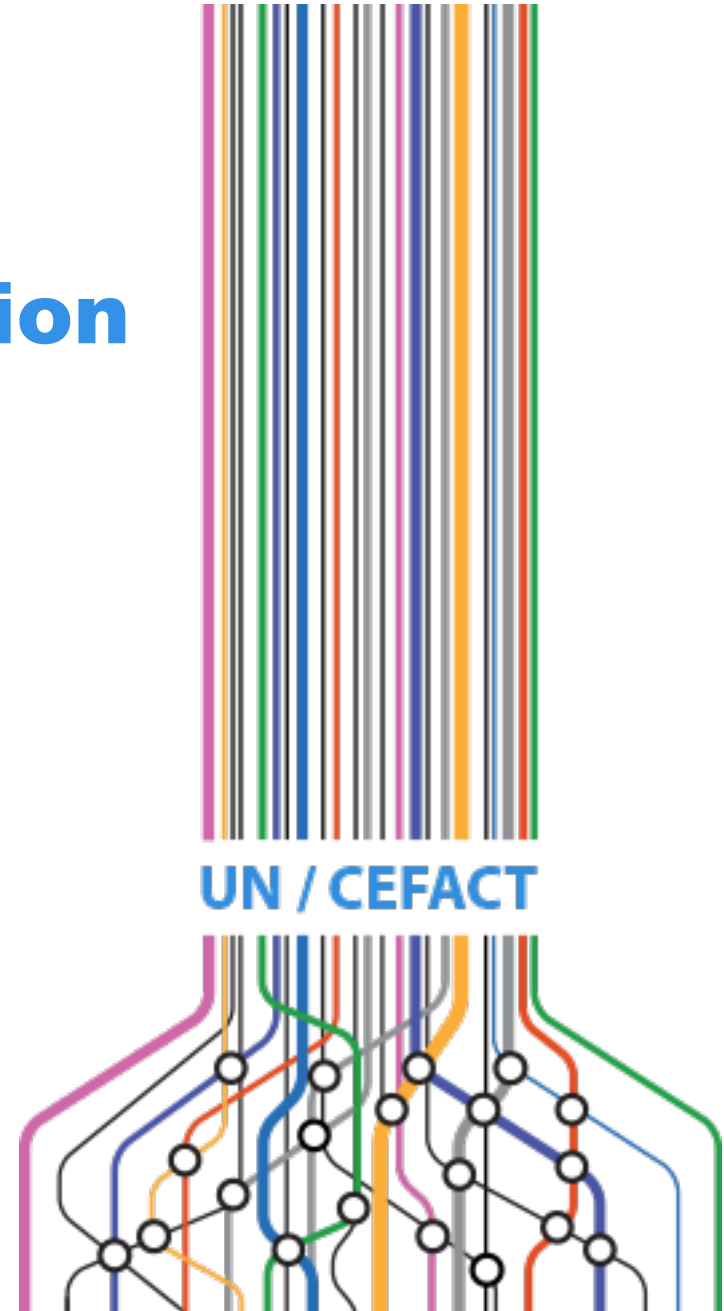


UN/CEFACT Semantic Vision

Tuesday, 27 June 2023

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

Hanane Becha (Vice-Chair)
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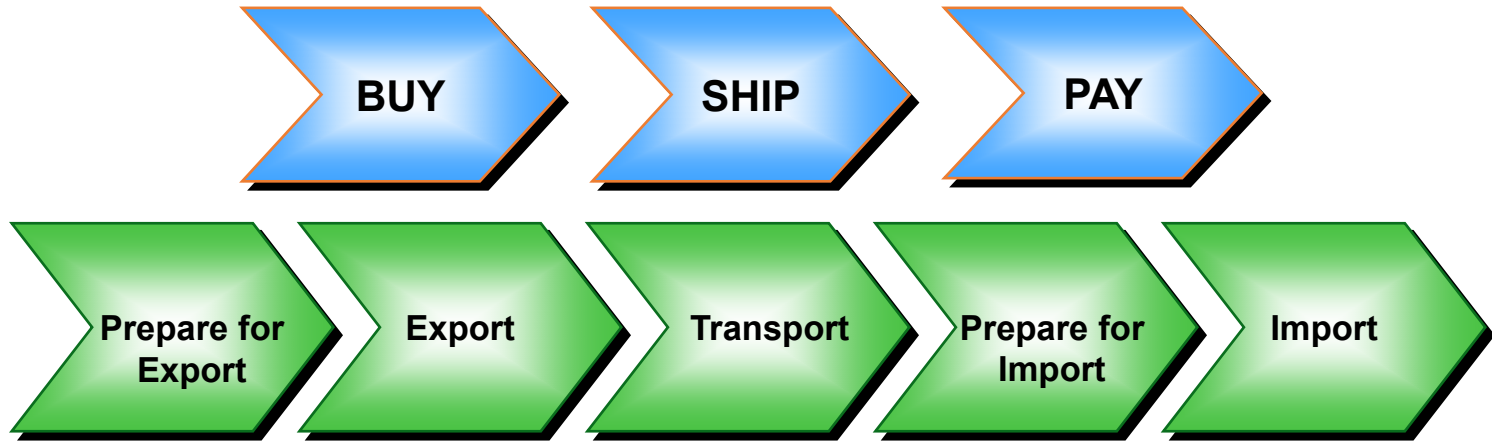
Data Exchange Generational View



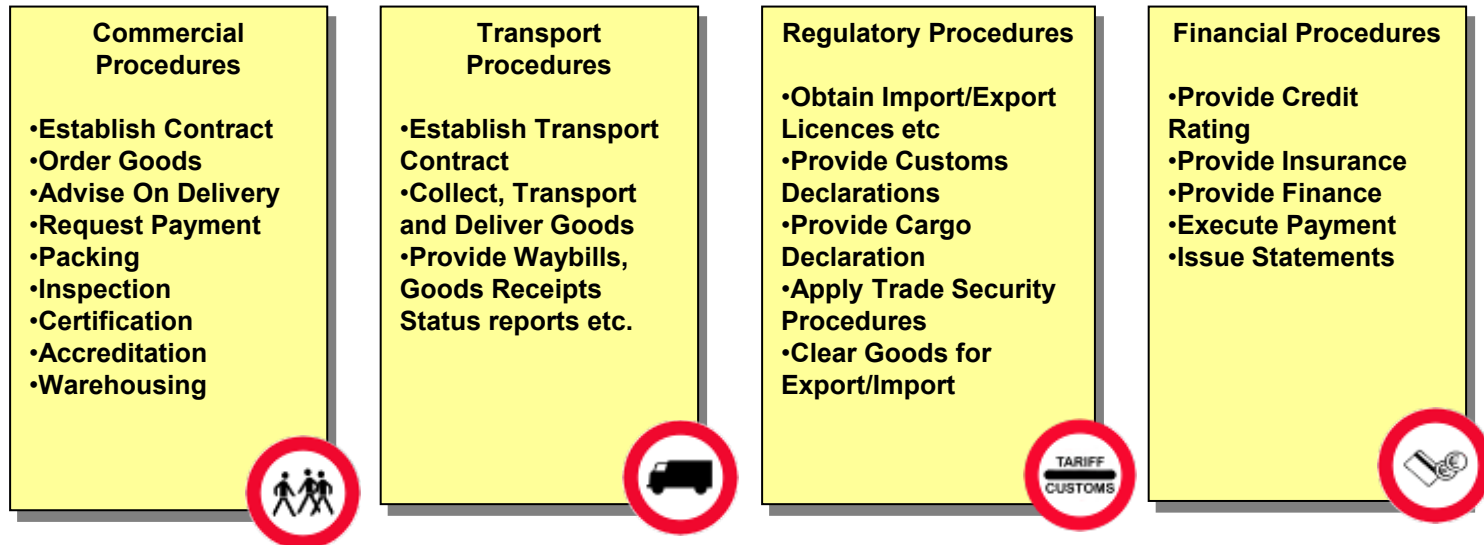
- 1st generation – UN Layout Key and Aligned Document Families
- 2nd generation – UN/EDIFACT global document equivalent electronic message structures
- 3rd generation – data exchange independent semantic document equivalent message structures (UN/XML)
- 4th generation – data exchange semantic Reference Data Models for reuse in both process driven and document equivalent exchanges (UN/XML and JSON schema)
- 5th generation – restful APIs (JSON LD)

The UNCCCL reused in Reference Data Model views of the International Supply Chain provides Common Semantics for use in the multi-generational projects which develop the UN/CEFACT eBusiness standards

UN/CEFACT International Supply Chain Process Model



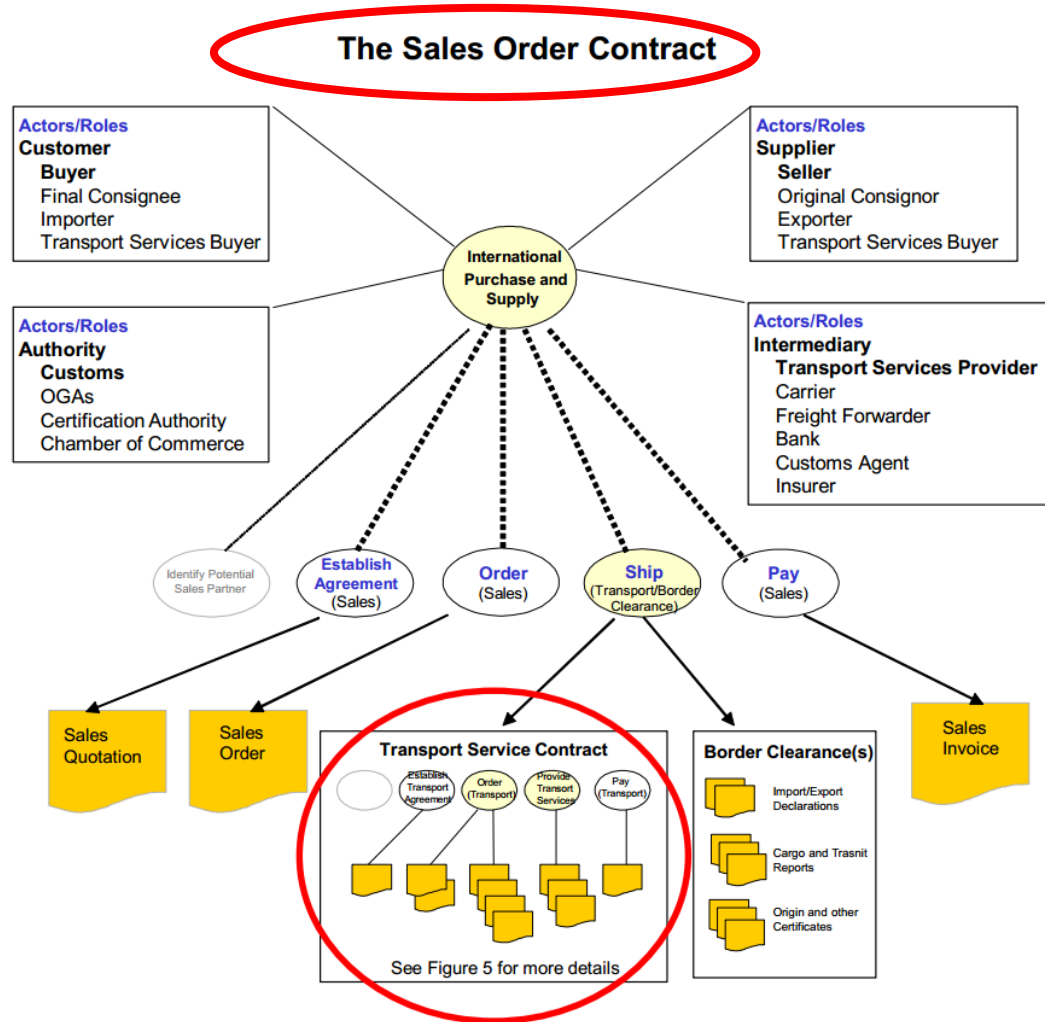
INVOLVES



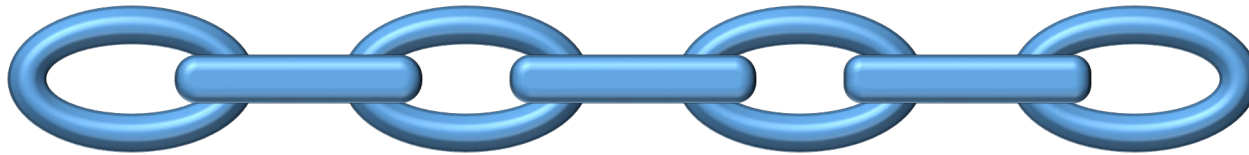
Global Supply Chain – Contractual View



UN / CEFAC



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 Management



UN/CEFACT evolution/revolution – Reference Data Models

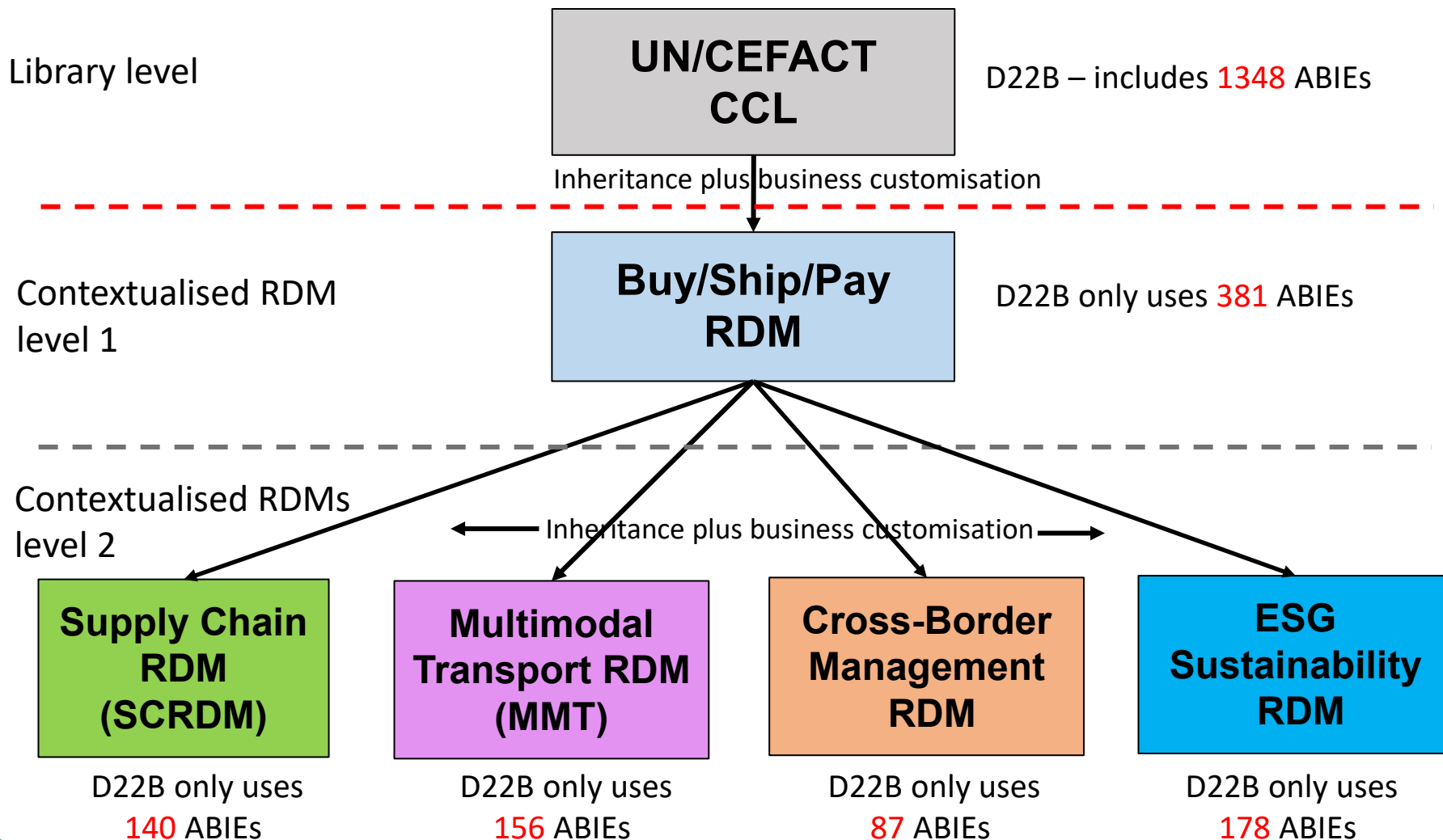


Benefits:

- Cross-Industry
- Multi Modal
- Trade & Transport semantic alignment – common **BUY SHIP PAY** foundation
- 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 across the international supply chain
- Standardized data exchange structures, based on common Master data exchange structure and independent of data exchange syntax
- Common semantic basis for implementing in chosen data exchange syntax(es)

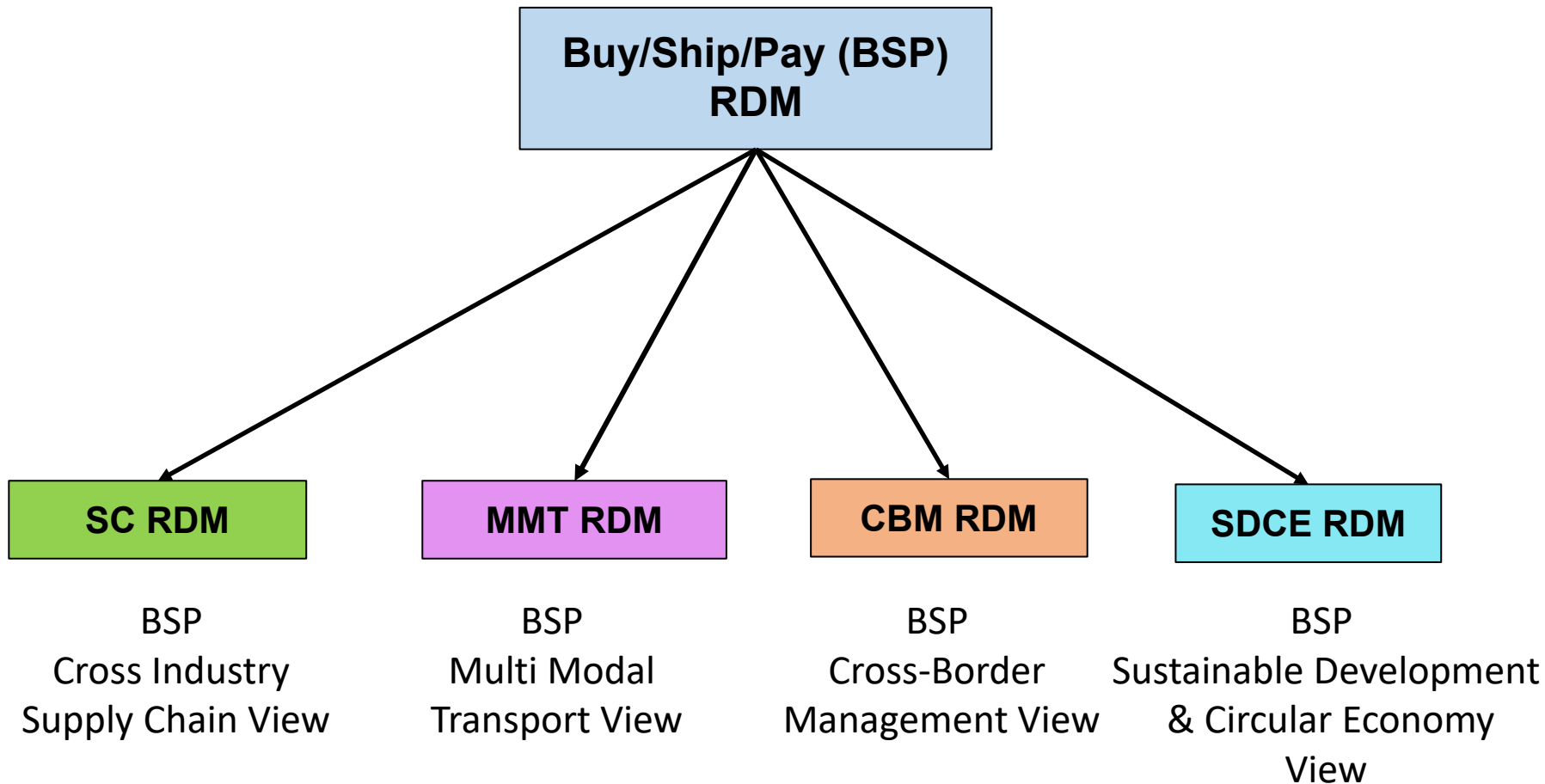


UN/CEFACT International Supply Chain Reference Data Model Family





UN/CEFACT International Supply Chain Reference Data Model Family - Future





Example Transport & Logistics Achievements



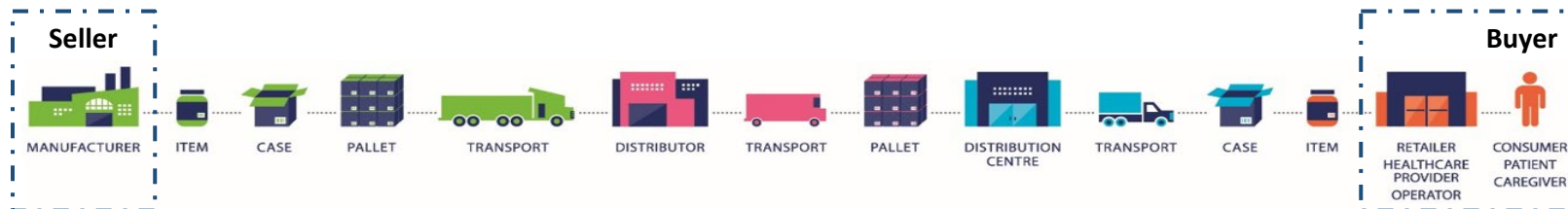
Recently Completed Projects

- Buy Ship Pay Reference Data Model
- Cross Industry Supply Chain Track and Trace eb Standard
- White Paper overview of Blockchain in Trade
- White Paper on Verifiable Credentials (to be developed into new TF Recommendation)
- Cross-Border Management RDM
- UNDA COVID-19 initiative (UNTTTC) – Electronic Transport Data Exchange Structures based on MMT (MultiModal Reference Data Model)
- Cross-modal Dangerous Goods data harmonisation

UN/CEFACT Semantic Publications:

<https://unece.org/trade/uncefact/mainstandards>

UN/CEFACT Cross Industry Supply Chain Track & Trace Project

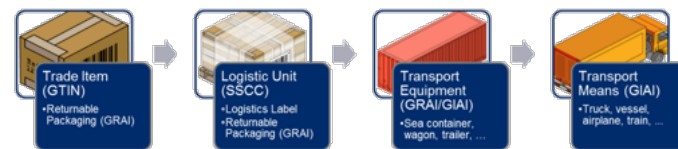


The mission of this project: Where is the product at any time?

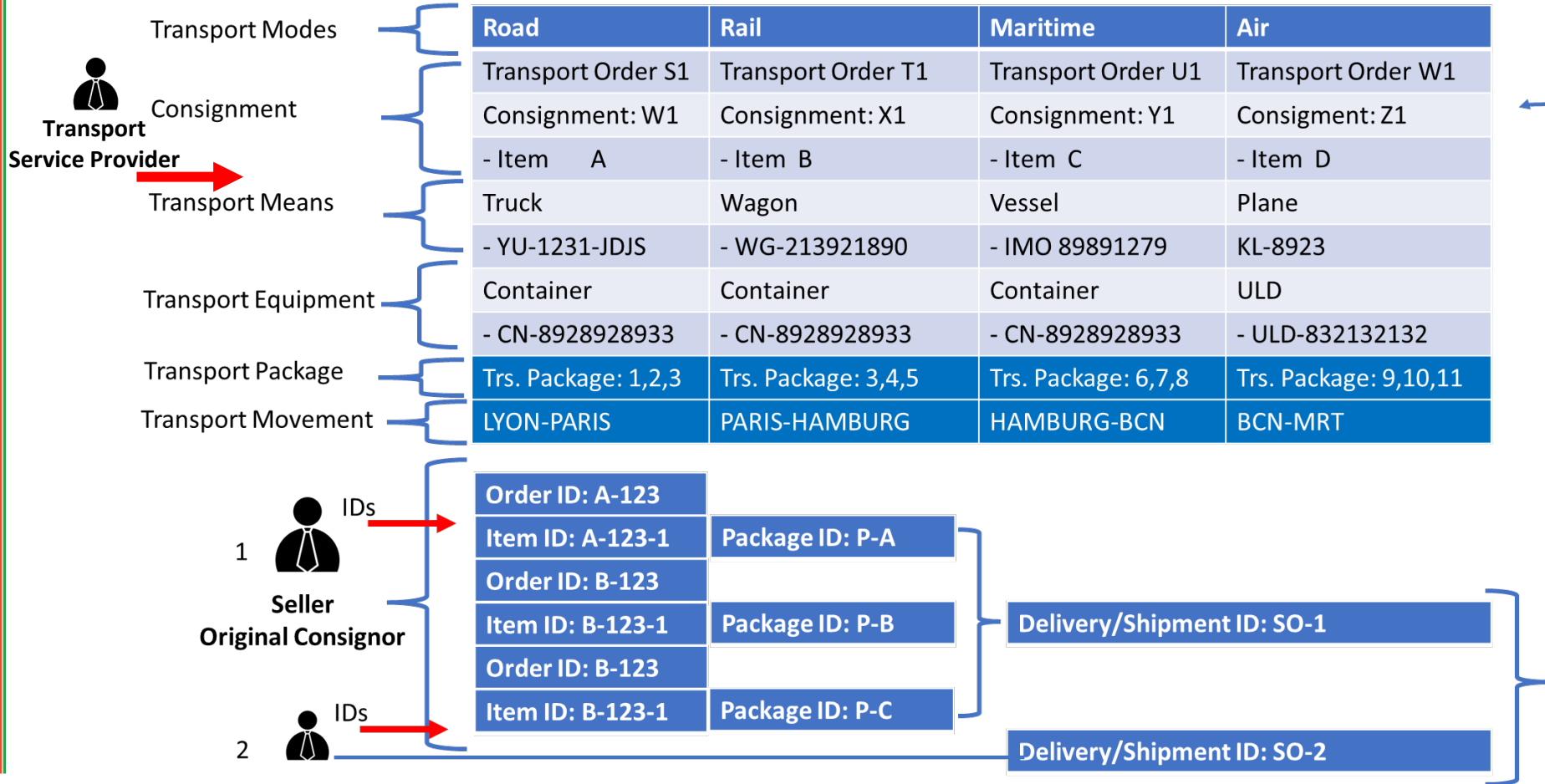
- Enable tracking and tracing of products (or assets) and information sharing in *standard* electronic format.
- Track and trace any *traded and identified items* including transport equipment or assets (e.g., box, pallet, container, etc. ... Even empty!).
- Logistic services: transport the traded goods between the *seller* and the *buyer*.

Challenges and opportunities

- Numerous stakeholders, large amount of information and multiple modes can be involved in a single journey
- End users and competent authorities have increasing expectations due to new regulations and technology progress
- Emergence of many digital data streams offering more visibility (smart containers, RFID, etc.)
- It is not possible to impose the usage of the same unique identifier across all logistic chain actors
- Many scenarios defining relationship of traded items, logistic units, transport and means of transportation (consolidation, de-consolidations, incident, etc.)



ID GAPS in multimodal transport cases



Trade and Transport identity gaps

Starting point

ID GAPS

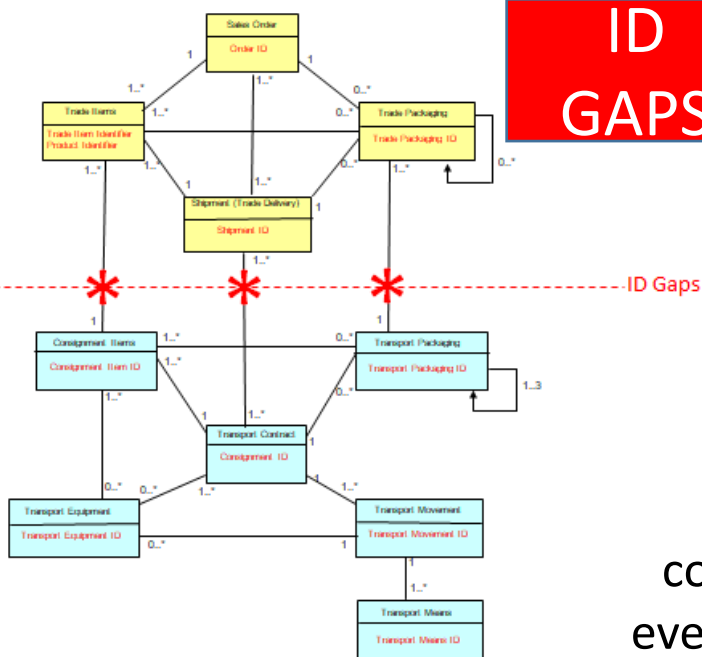
Will transport incorporate trade IDs?

NO, only some by transport service buyer of the original seller/consignor

How to solve?

Create a collection of events carrying the different IDs

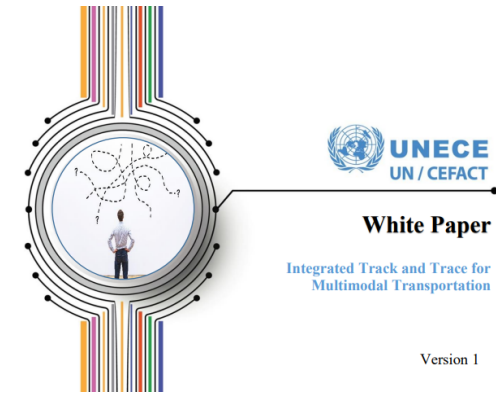
Pass the IDs (links) through the transport value chain



Track & Trace Project Deliverables



- **White Paper: “Integrated Track and Trace for Multi-Modal Transportation”** presented to the 27th UN/CEFACT Plenary in April 2021
- **Business Requirements Specification (BRS)** detailing the Business Processes of Cross Industry Track and Trace



White Paper

Integrated Track and Trace for Multimodal Transportation

Version 1



UNITED NATIONS ECONOMIC COMMISSION FOR EUROPE
UNITED NATIONS CENTRE FOR TRADE FACILITATION
AND ELECTRONIC BUSINESS (UN/CEFACT)

BUSINESS REQUIREMENTS SPECIFICATION (BRS)

Integrated Track and Trace for Multi-Modal Transportation

INTERNATIONAL SUPPLY CHAIN PROGRAMME DEVELOPMENT AREA
TRANSPORT AND LOGISTICS DOMAIN

UN/CEFACT – ISC-PDA/T&L SC-T+T – P1073

SOURCE: SC T+T Project Team
DATE: 14 September 2022
STATUS: Approved

Version: 0.1

UN/CEFACT has developed a new international eBusiness standard to enable improved tracking of goods across complex supply chains

UN / CEFACT

Events to capture the different IDs

1. Packing
2. Consolidation
3. Combining consignments
4. Loading consignment onto transport means
5. Unloading consignments from transport means
6. De-Consolidating Consignments
7. Shipment splitting event

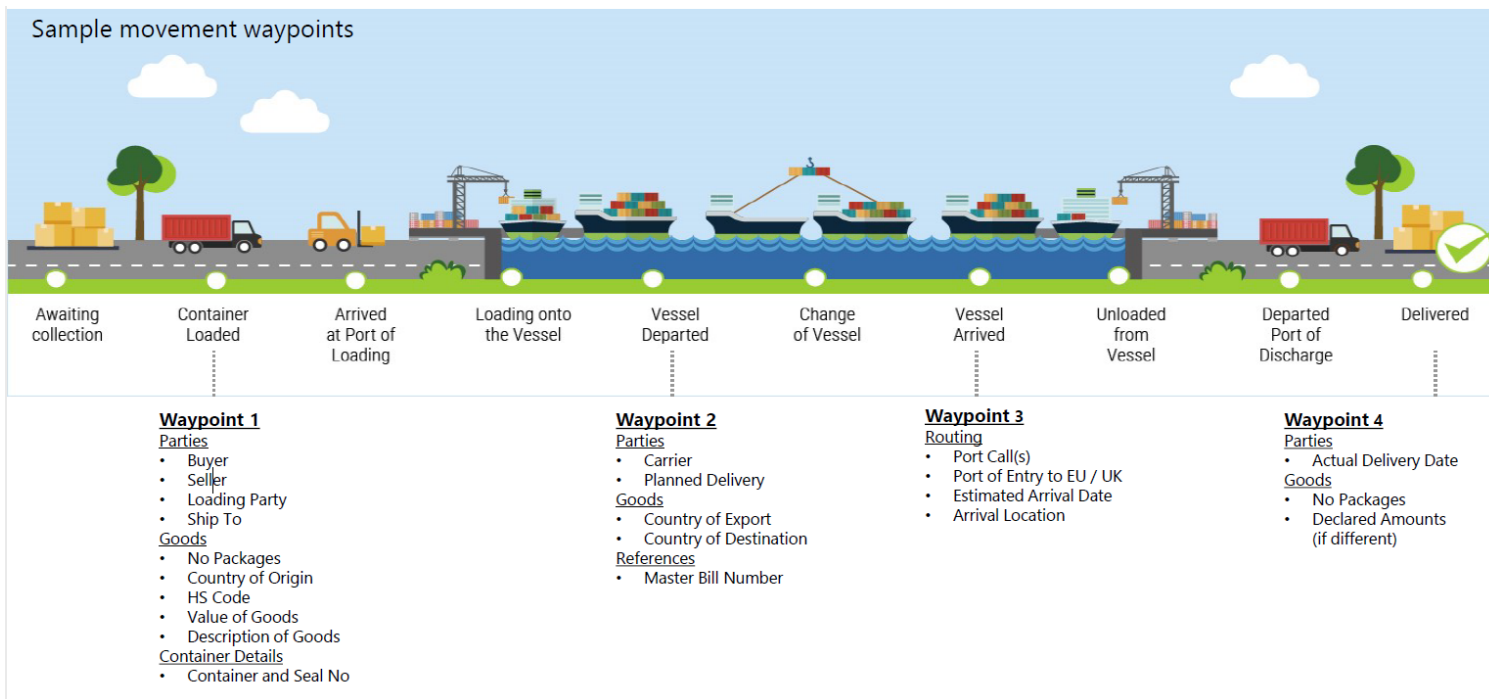


Key Trace and Track Messages



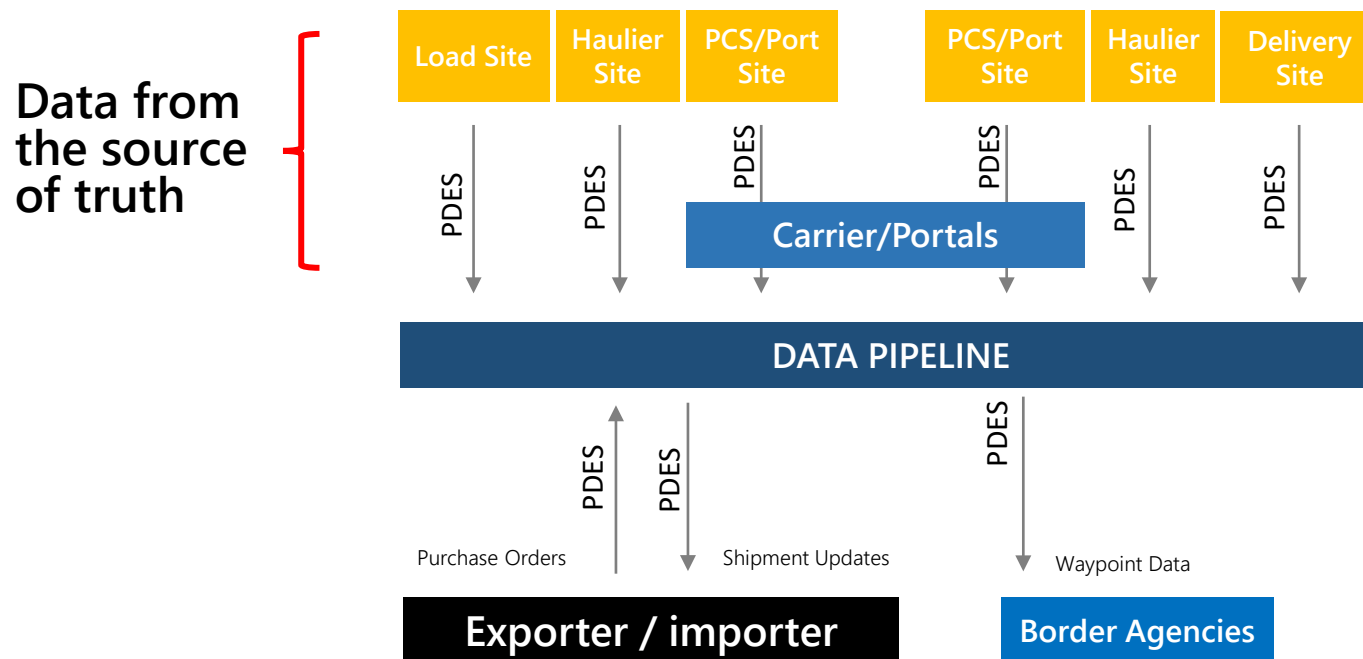
- Decentralized identifiers – accepting different IDs, as long the identifier is associated with a recognized standards body. This is referenced today in the UN/CEFACT MMTRDM
- **UN/CEFACT MMT RDM already contains all required semantic data structures**
- Combining existing data elements in concert with using new digital technologies make it now possible to close the trade-transport gap and move closer toward operational and systems interoperability.
- **Supports mapping to existing standards such as GS1 defined unique identifiers and event structure (EPCIS)**

Pipeline Data Exchange Standard (PDES)



- Supply Chain data extracts sent to regulatory agencies at key time points
- Standardised overall data exchange structure
- Quality data from the original source at earliest time
- Regulatory and supply chain visibility benefits

UN/CEFACT Data Pipeline Exchange Standard (PDES)



Principle:

Right data from the **Right** person at the **Right** time

UNTTC Transport & Trade Connectivity in the age of pandemics

- UN New York launched **COVID-19 initiative to encourage exchange of digitised electronic data** rather than paper documents in transport contract related data exchanges
- **UNECE and UN/CEFACT joint contribution:**
 - UN/CEFACT Cross-modal project to develop modal data exchange guides as subsets of the UN/CEFACT MMT Reference Data Model to support digitised data exchanges between transport modes
 - **7 Heads of Delegation** supported the Project (Germany, Spain, Greece, Russia, Italy, US and Ukraine)
 - Project completed all ODP steps successfully and published on UN/CEFACT website plus links to UNTTC website

Dangerous Goods MMT-based Customisations



✓ Maritime



✓ Inland Waterway



✓ Road



✓ Air



✓ Rail

In conjunction with UNECE Transport Division, IMO FAL, ICAO and the EU DG MOVE eFTi and EMSWe Regulation development

UN/CEFACT Semantics enable cross-modal harmonisation



MMT-based Inter Modal Matrix (Auto-generated)

	C	D	E	F	G	H	I	J	K	L	M	N	O
1	BN	FIATA Bill	CIM-SMGS	CIM-SMGS URL	Wagon List	River B/L	Maritime B/L	eCMR	EFTI DR FEB2021	EFTI DG to	Air Waybill	Air CSD	Air DG
2	BN	FIATA Bill	CIM-SMGS Co	CIM-SMGS Co	Wagon list; Co	River Bill of Lading	Maritime B	eCMR MMT; R	EFTI DESCopy	MMT Cont	Air Wayb	CSD; D21	DG Decla
3	MMT CCBDA IFTM** Data Exchange Structure	X	X	X	X	X	X	X	X	X	X	X	X
4	Exchanged Document Context							X					
10	Exchanged Document	X	X	X	X	X	X	X			X	X	X
11	ID	X	X	X	X	X	X	X			X	X	X
12	Name												
13	Type Code					X	X	X			X	X	X
14	Issue Date Time	X	X	X	X	X	X	X			X	X	X
15	Remark							X					
16	Original Issued Quantity	X				X							
17	Copy Issued Quantity	X				X							
18	Purpose Code		X	X							X	X	X
19	Sender Assigned ID		X	X									
20	Recipient Assigned ID		X	X									
21	Version ID		X										
22	Note		X	X				X				X	
23	Subject Text							X					
24	Content Code							X					
25	Content Text		X	X				X				X	
26	Subject Code							X				X	
27	Reference Document		X	X									
28	Type Code		X	X									
29	Issue Location	X				X	X	X			X		X
30	ID	X				X	X	X			X		X
31	Name	X				X	X	X			X		X
32	Country Code	X						X					
33	Contractual Clause	X	X	X							X		
34	ID	X									X		
35	Content Text	X	X	X							X		
36	Air Waybill Consignor Signatory Authentication	X	X	X	X						X		
37	Actual Date Time	X	X	X							X		

Support for JSON



- All RDM data exchange subsets to be published as JSON schema
- JSON schema export technical specification almost completed
- UN/CEFACT developing JSON-LD web vocabulary based on RDM semantics
- JSON deliverables to support future restful API developments

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



BUY SHIP PAY (BSP)

*Semantic model
Subset of UN/CCL*

SHIP (MultiModal Transport)
CCL subset

BUY SHIP PAY

Master message structure

SHIP

Master message structure

MMT subset

*Exchange syntax-neutral
data exchange structure*

eCMR message structure

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

Multi
Modal
Transport
RDM

Multi
Modal
Transport
RDM
Customised
Subset
(Decorated)



Trade Example: UN/CEFACT Cross Industry Invoice (CII)



UN / CEFACT

BUY SHIP PAY (BSP)

*Semantic model
subset of UN/CCL*

Part of

SEMANTIC MODEL
Supply Chain (BUY PAY)
(subset of BSP)

BUY SHIP PAY

Master message structure

Part of

Supply Chain (BUY PAY)
Master message structure

BUY PAY

*Exchange Syntax-neutral business data
exchange structure*

Invoice message model

Syntax

XML Invoice schema

CII
European Invoice
Mandatory Syntax
Implementation



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

For further Information

- All UNECE and UN/CEFACT Recommendations, codes, standards and publications are available for free on our website at:
- www.unece.org/cefact/ and tfig.unece.org
- All experts are welcome to join the standards development work free of charge

UN/CEFACT Secretariat

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