



*Evolution from aviation
Cargo XML to data sharing
in multimodal transport.*

Henk Mulder
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IATA



evolution of air cargo data exchange technologies

1980

Paper Documents



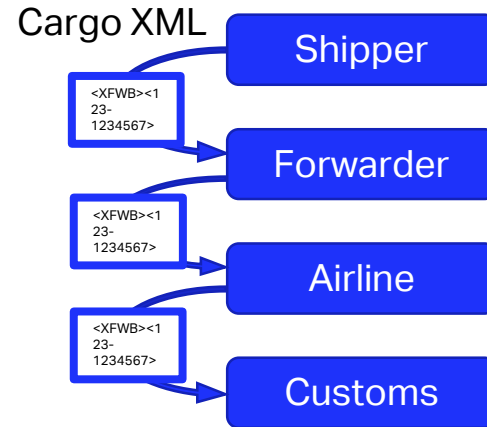
IATA air cargo resolutions

- Cargo Services Conference (CSC)

2000

EDI

Electronic Document Interchange



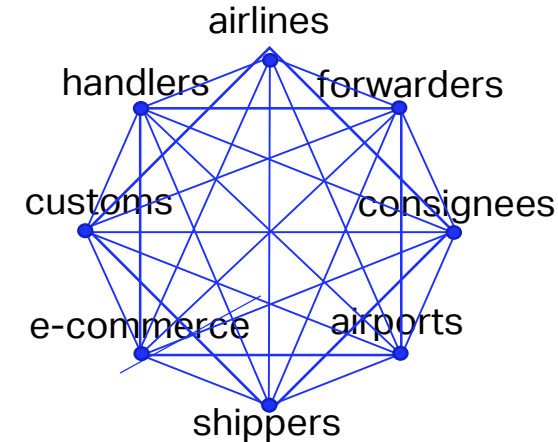
eFreight

- E-AWB
- Cargo IMP
- Cargo XML

2020

API

Application Programming interface

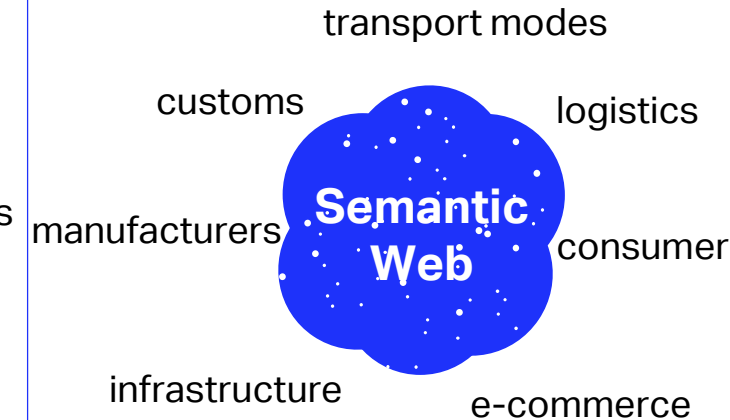


Digital cargo standards:

- ONE Record
- Interactive Cargo

2030

Semantic Web

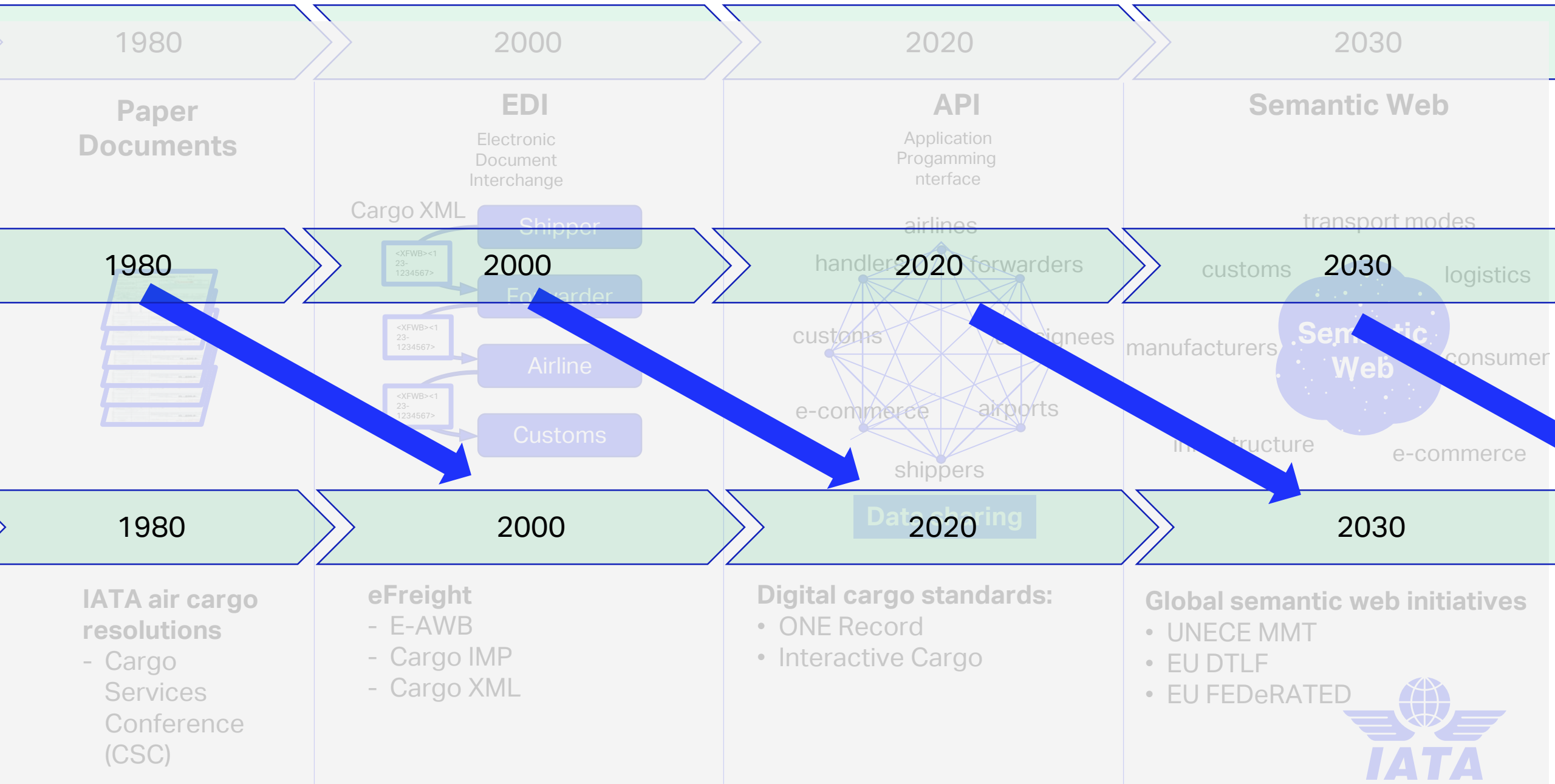


Global semantic web initiatives

- UNECE MMT
- EU DTLF
- EU FEDeRATED



The challenge: Development and adoption of standards

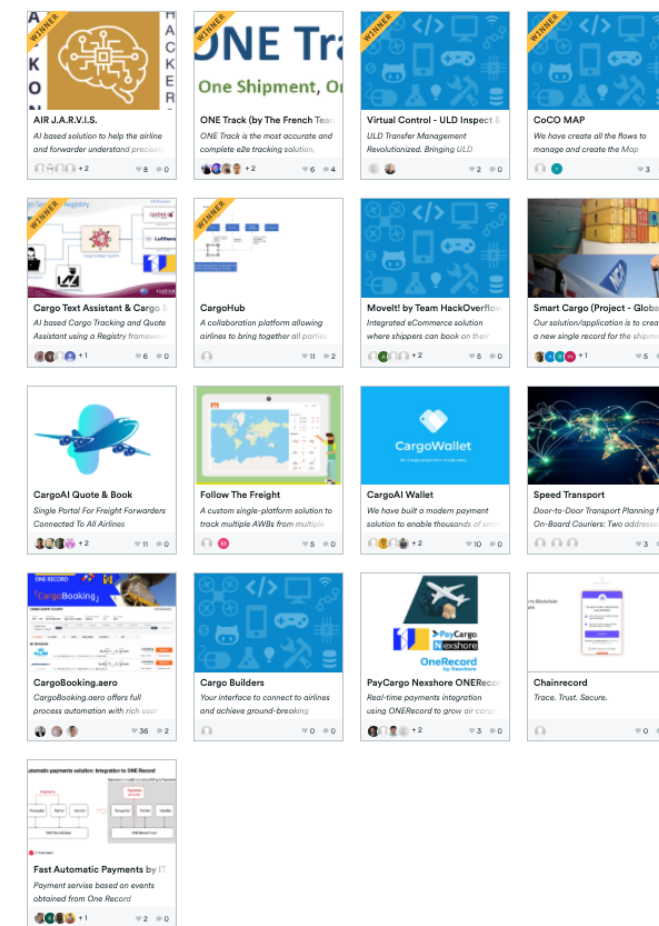
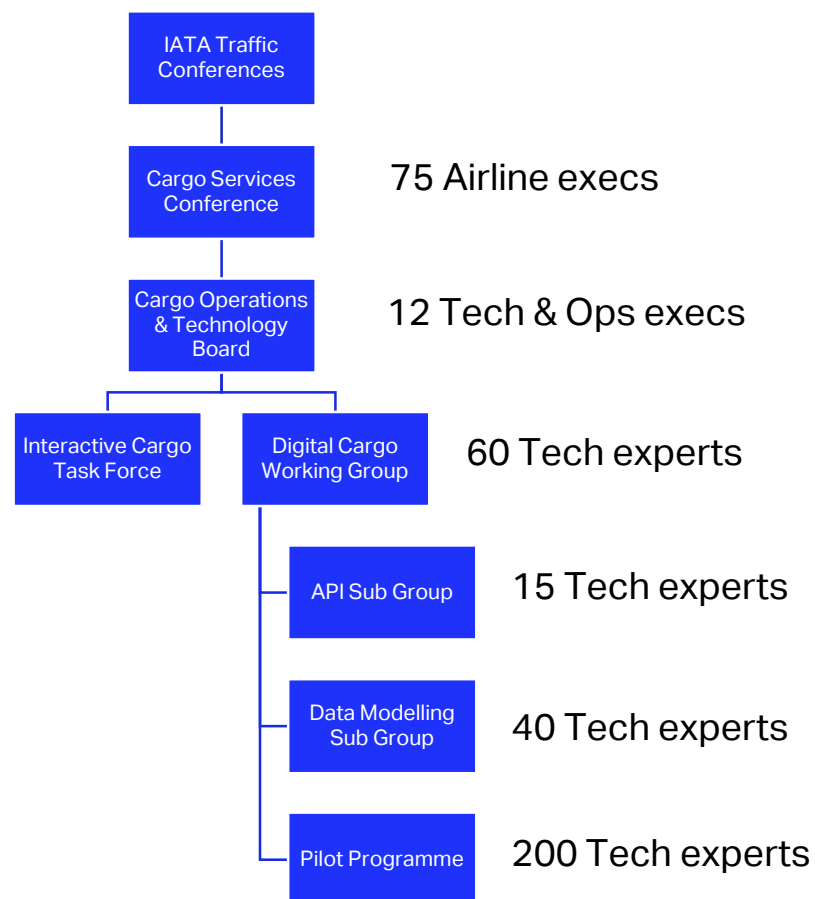


Stakeholder involvement

Governance

Pilot testing

Hackathons

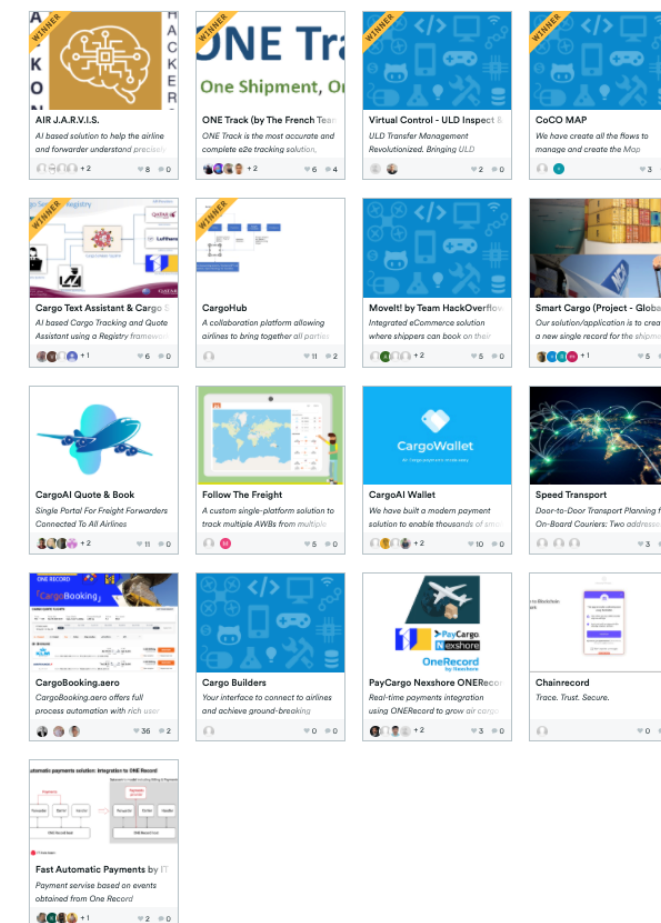
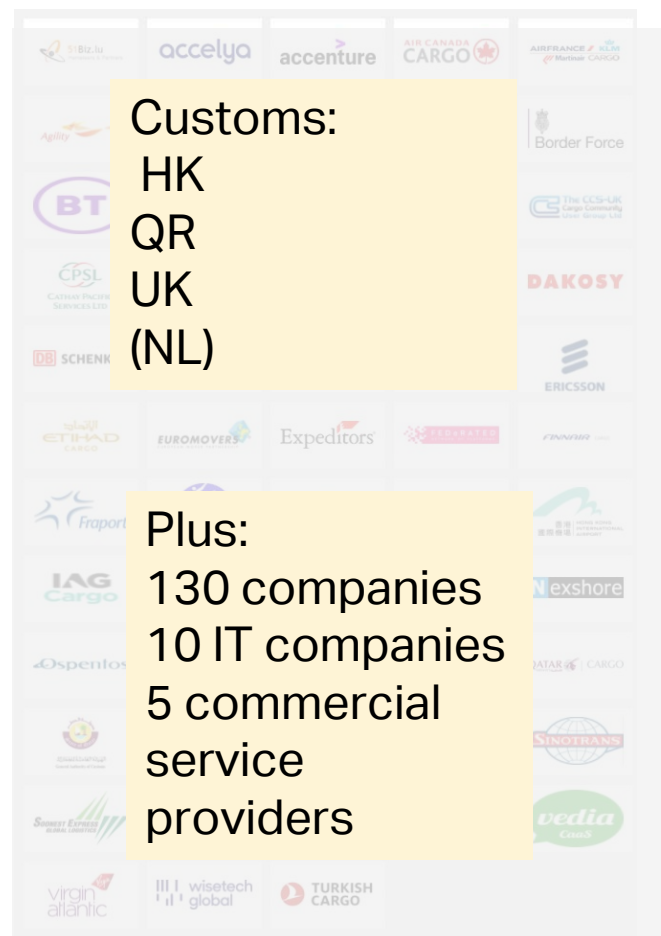
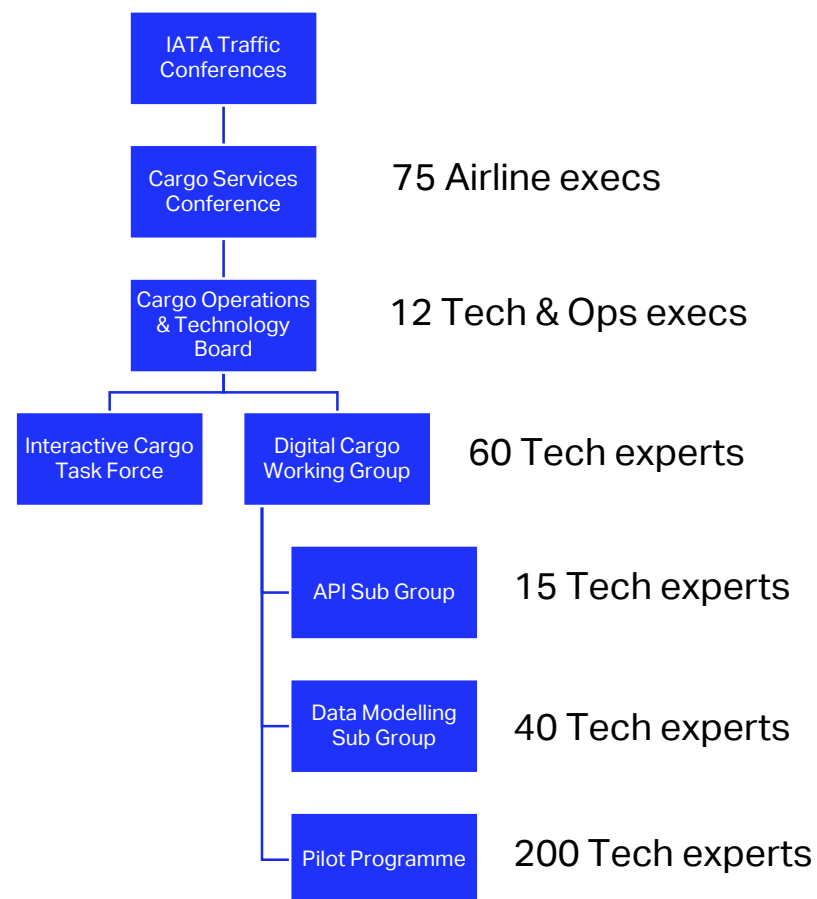


Stakeholder involvement

Governance

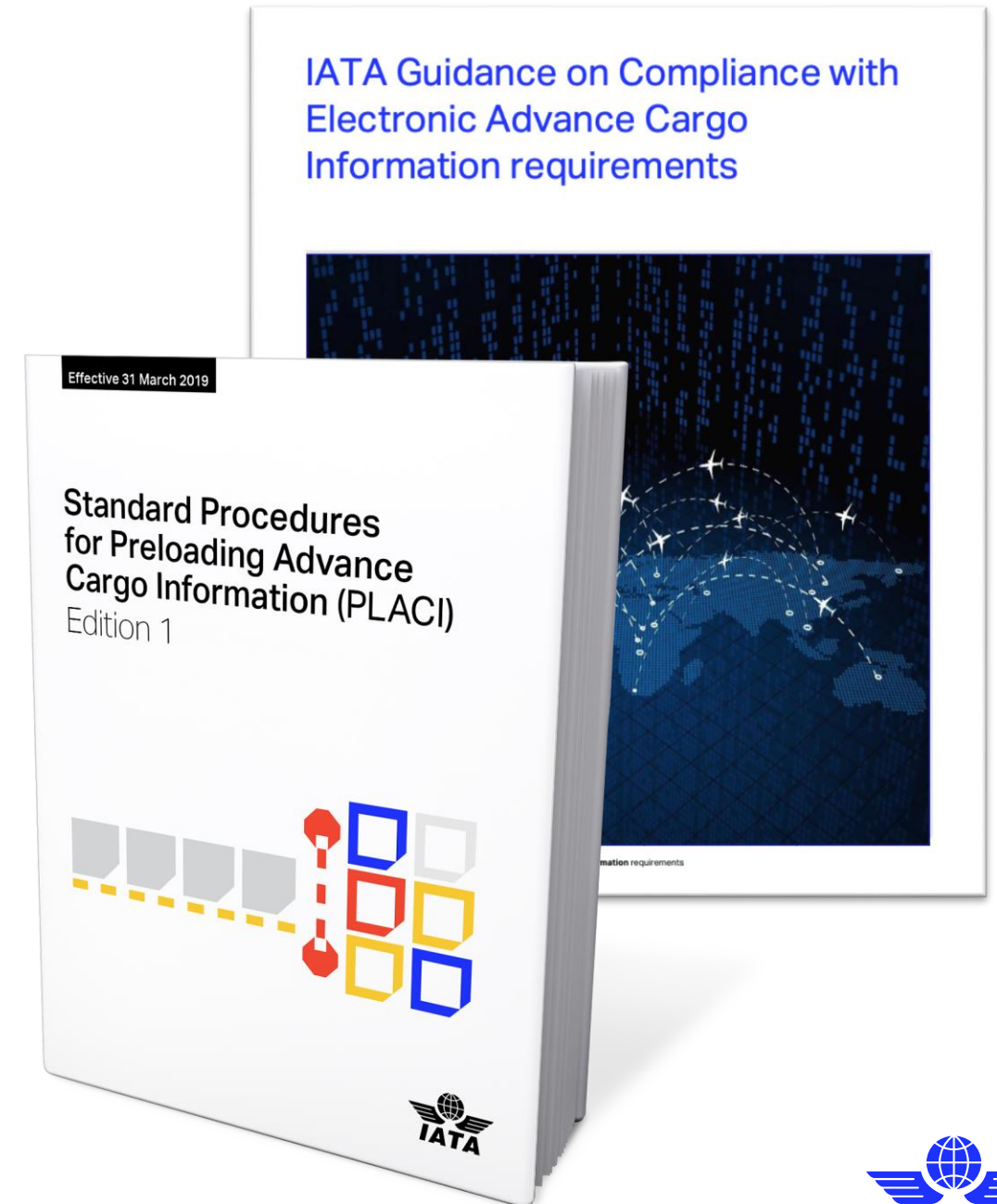
Pilot testing

Hackathons



Support for Cargo ACI

- *ACI is supported by IATA Cargo XML Messages which are consistent with the WCO data model*
- *New standards like IATA ONE Record also matched the required data set.*
- *ONE Record data sharing allows to advance data access where needed.*
- *Joint work with WCO and ICAO led to Joint Guiding Principles for PLACI*
- *IATA subsequently issued a Recommended Practice for aviation industry implementation of PLACI.*



Semantic data across transport modes

The challenge: many different standards and approaches to data in different transport modes.

Two valid approaches to connecting the modes:

- 1) Data matching:** UNECE Multi Modal Transport Data Model: matches data across all modes. Supported by ICAO.
- 2) Semantic Data Models:** focus on the concepts behind data
 - 1) Not limited to transport & logistics, more than 1000 other industries and sectors (Semantic Web and Linked Data)
 - 2) Does not require backward adaptation of data models.

Semantic data across transport modes

Who uses this?

- 1) IATA ONE Record
- 2) UNECE Multi Modal Transport
- 3) EU Digital Transport & Logistics Forum (DTLF) support by FEDeRATED and FENIX projects.
- 4) FEDeRATED has developed a semantic for linking data from different transport modes but does not substitute data models from these sectors.

How about a semantic version of the WCO data model/WCC?

Semantic data queries: POC

"Which stations support regenerative braking on arrival?"

```
7 WHERE {  
8 SERVICE <https://federated-vocol.tnodatalab.nl/fuseki/dataset/query> {  
9   ?event rdf:type event:ArrivalEvent ;  
10     event:involvesDigitalTwin ?dt ;  
11     event:involvesPhysicalInfrastructure ?pi .  
12 }  
14 SERVICE <https://linked.ec-dataplatform.eu/sparql> {  
15   ?pi <http://data.europa.eu/949/inCountry> <http://publications.europa.eu/resource/authority/country/NLD> ;  
16     rdfs:label ?trainStation .  
17 }  
19 SERVICE <https://api.triptydb.com/datasets/CBouter/Trains/services/Trains/sparql> {  
20   ?dt rdf:type <http://data.europa.eu/949/Vehicle> ;  
21     era:vehicleType ?vehicleType .
```

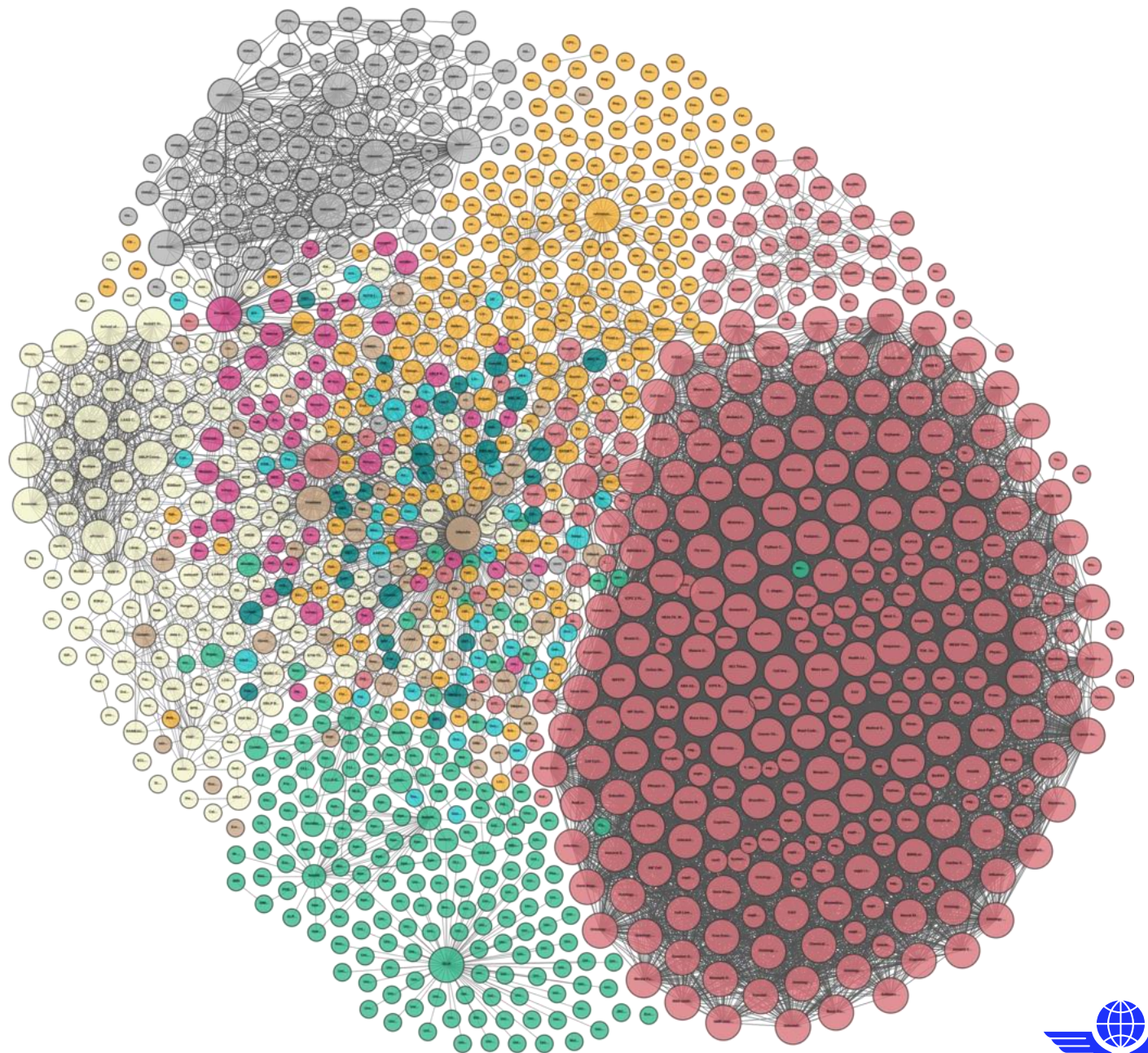
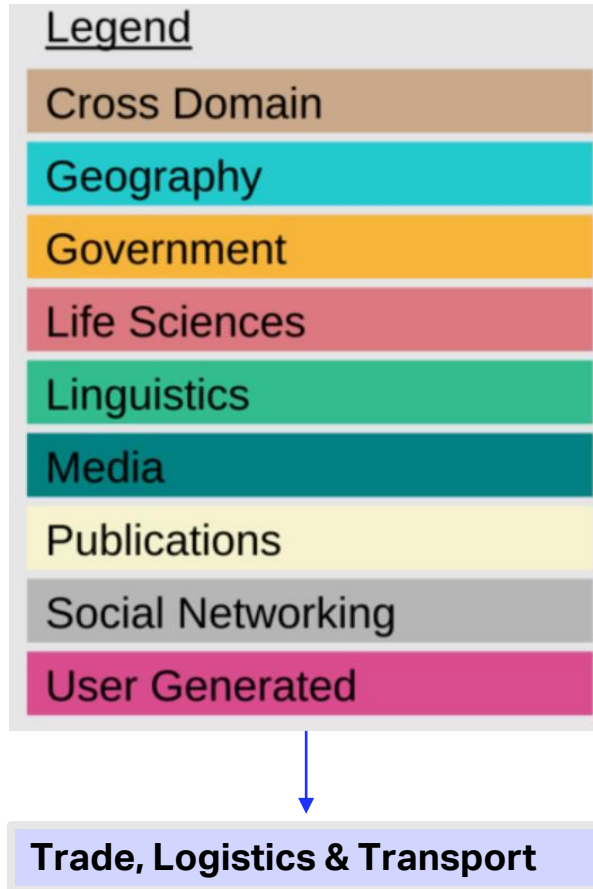


Uses 3 independent data sources and models...!

QUERY RESULTS

	event	trainStation	regenBrake
1	<https://www.examplecompany.eu/data/events#ArrivalEvent_2>	"Rotterdam Centraal"	"true"^^xsd:boolean
2	<https://www.examplecompany.eu/data/events#ArrivalEvent_1>	"Rotterdam Centraal"	"false"^^xsd:boolean

Semantic web





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