

# ONE Record

One step closer to digital cargo

David Sauv

Manager, Digital Cargo



# Context





International trade is about moving goods



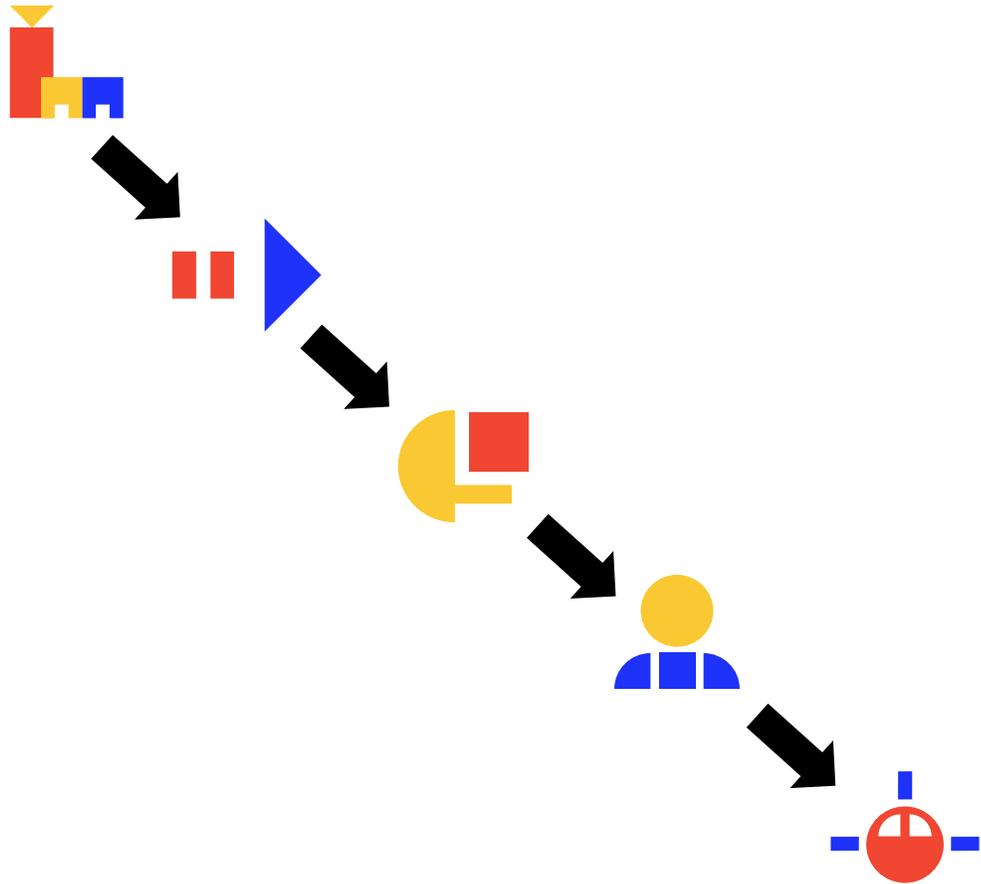
But also is about **information sharing**

**Each year, more than  
7'800 tons of paper  
documents are processed**

It's the equivalent of 80 Boeing  
747 freighters filled with paper



# A legacy peer to peer messaging model



# Capitalize on Internet technologies



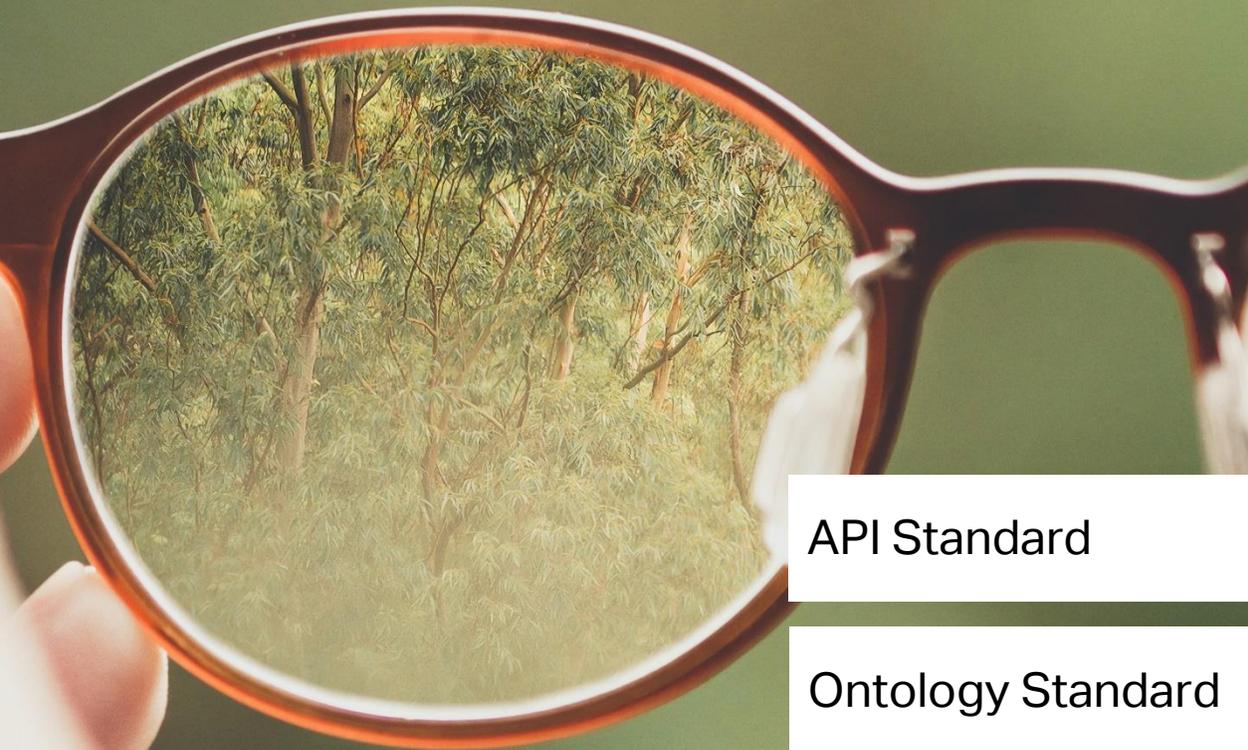


# The Vision

An end-to-end digital logistics and transport supply chain where data is easily and transparently exchanged in a digital ecosystem of air cargo stakeholders, communities and data platforms



transparency



API Standard

Ontology Standard

Security Standard

Bud Helisson, Unsplash

End-to-end data  
visibility

For authorized  
parties



open innovation

Open standards –  
free license

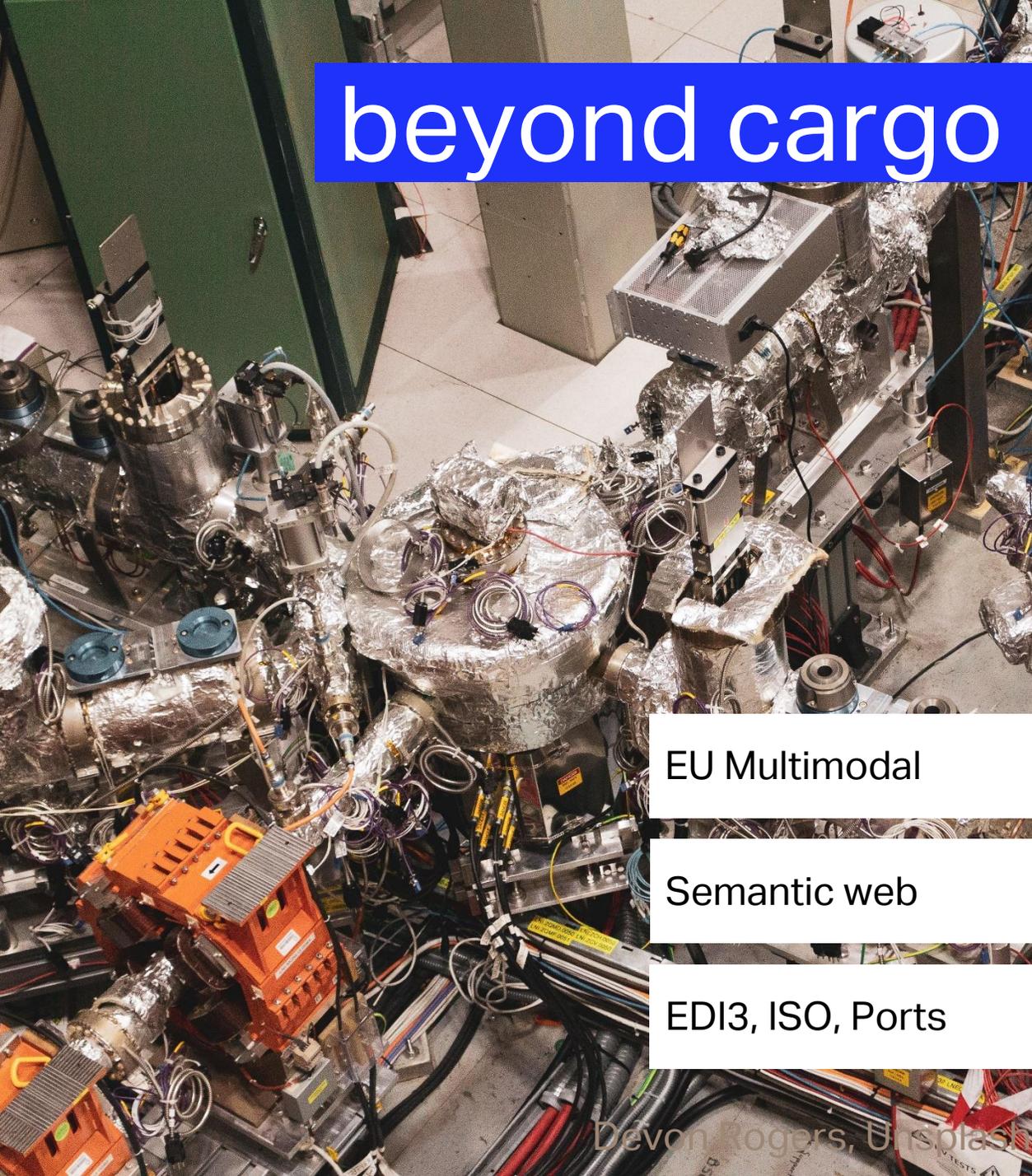
Open and  
cooperative  
development

GitHub

Ontology Editor(s)

Open Governance





beyond cargo

EU Multimodal

Semantic web

EDI3, ISO, Ports

Devon Rogers, Uniplas

Data sharing &  
open access is not  
only a transport &  
logistics challenged

Share and learn  
from the best





tech is  
easy

Backward  
integration

Open software

90 day ROI devs

Leo Rivas, Unsplash

Legacy technology  
is hard

New tech is easy

We need to look  
forward





plug & play

Plug = connecting systems without integration

Play = creative use of new data from partners

ONE Record standard

Digital Partners

Data as a Service

Tim van der Kuip, Unsplash





digital  
opportunities

Ontology networks

Micro services

Analytics &  
Services

Digital twin of  
logistics &  
transport networks

New technologies:  
AI, ML, DLT, QC



# Intelligent transport

Automated  
transport chains

Interactive cargo

Flow optimization

Real Time

IoT



a new

generation

Data science

Sub second  
decision making

People in charge

Digital Natives will  
be leading our  
companies within  
10 years

Their agenda:

- Digital only
- Delegate to AI
- ...



a new

generation

Data science

Sub second  
decision making

People in charge

Digital Natives will  
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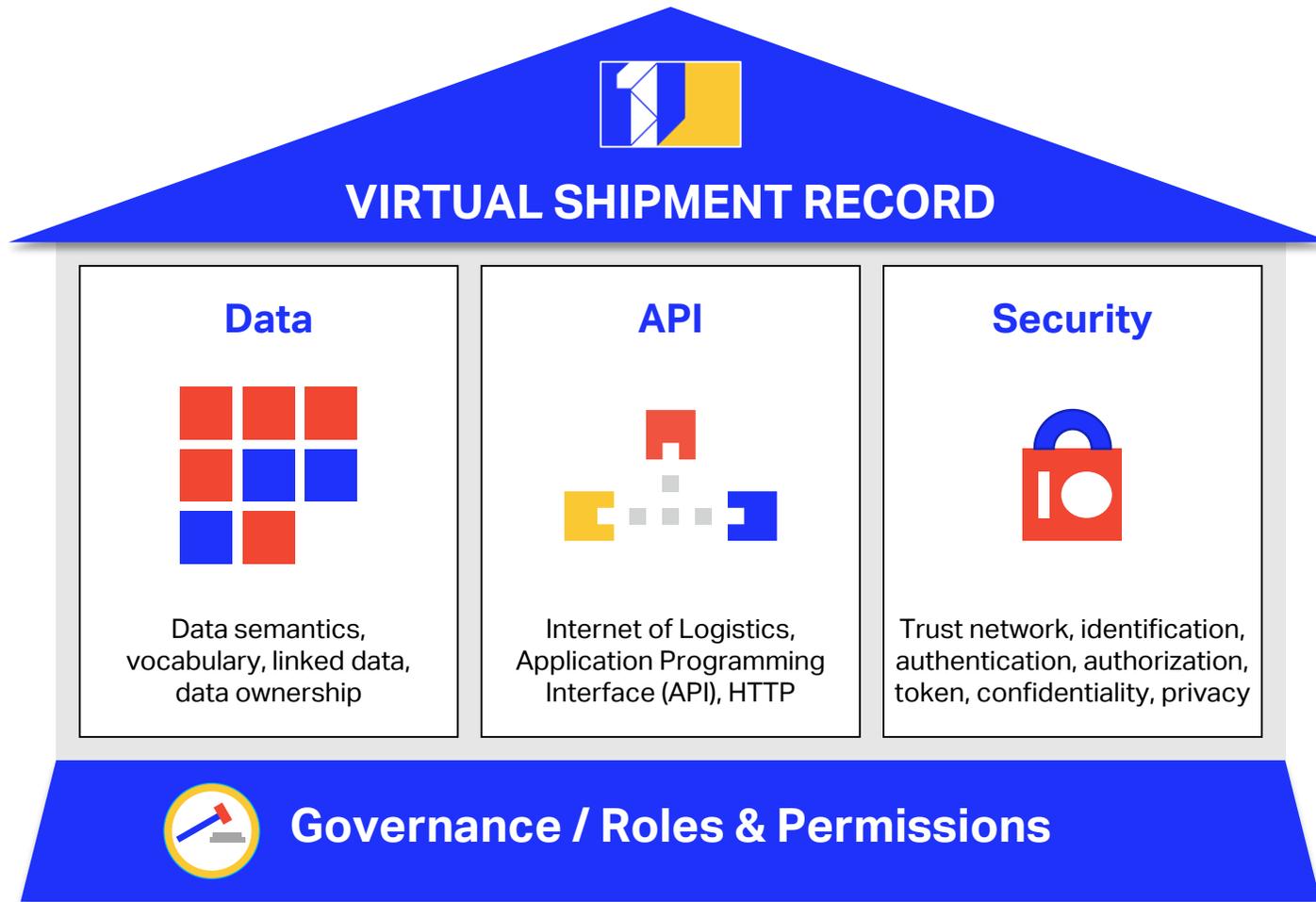
- ...

# ONE Record Concept





# ONE Record concept



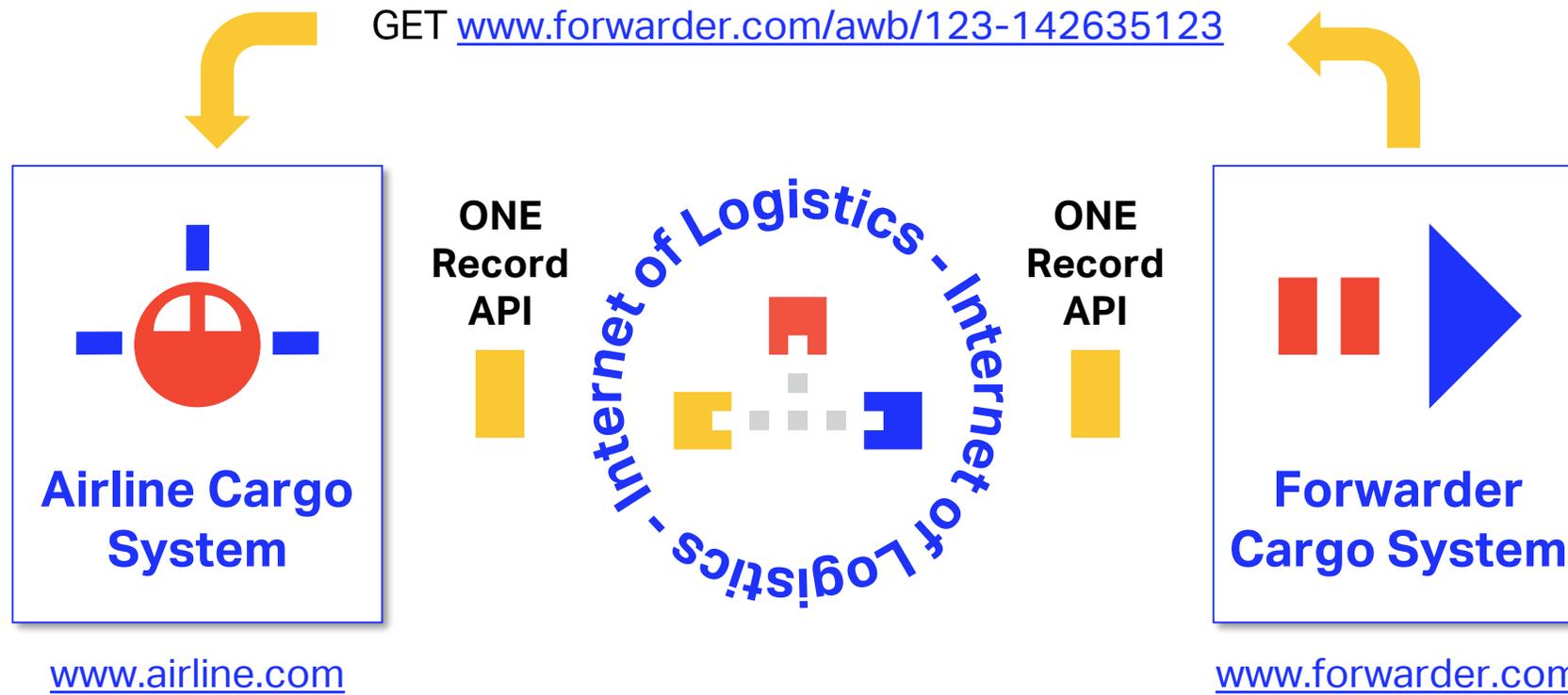
The ONE Record concept is based on 3 pillars enabling to define:

**WHAT, HOW, with WHOM**

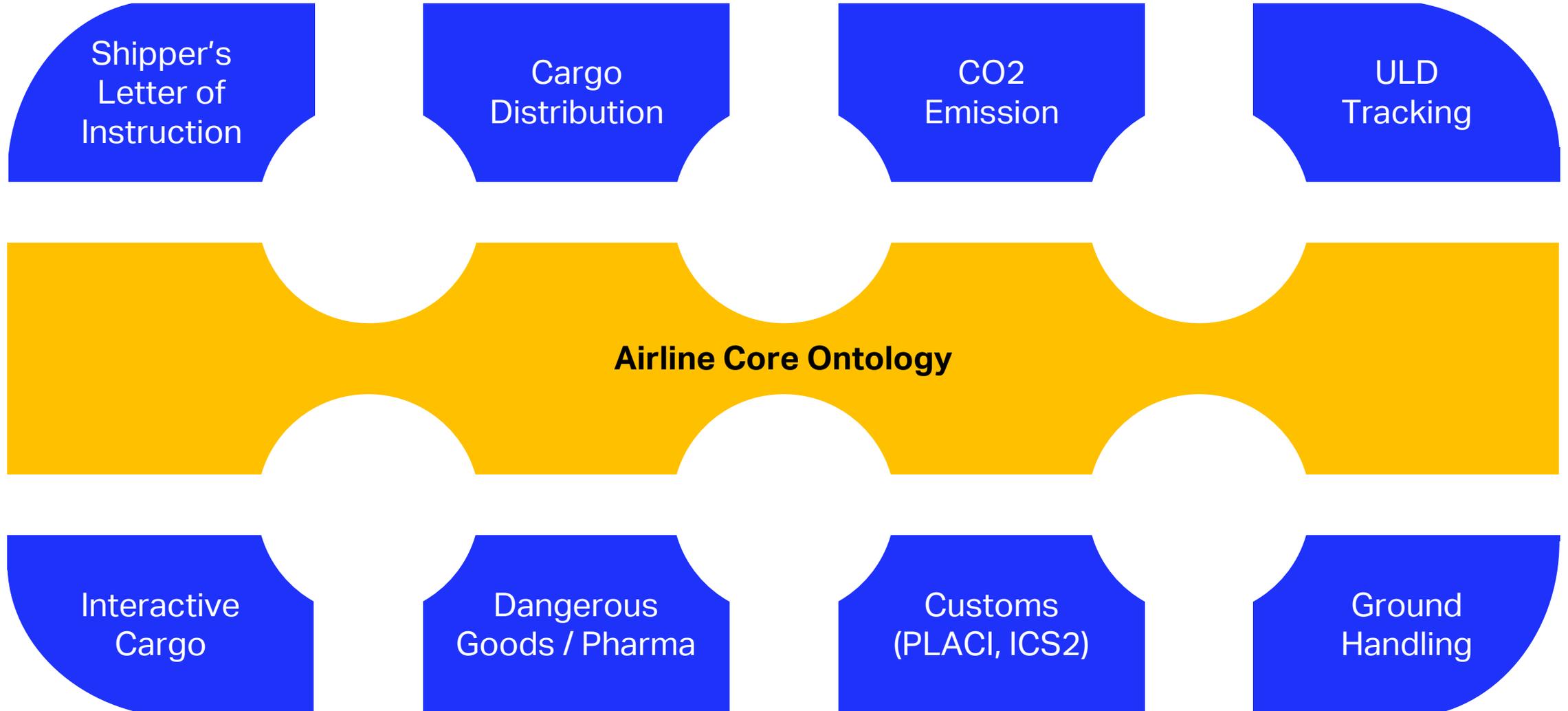
data can be shared

# ONE Record / web technologies and URI

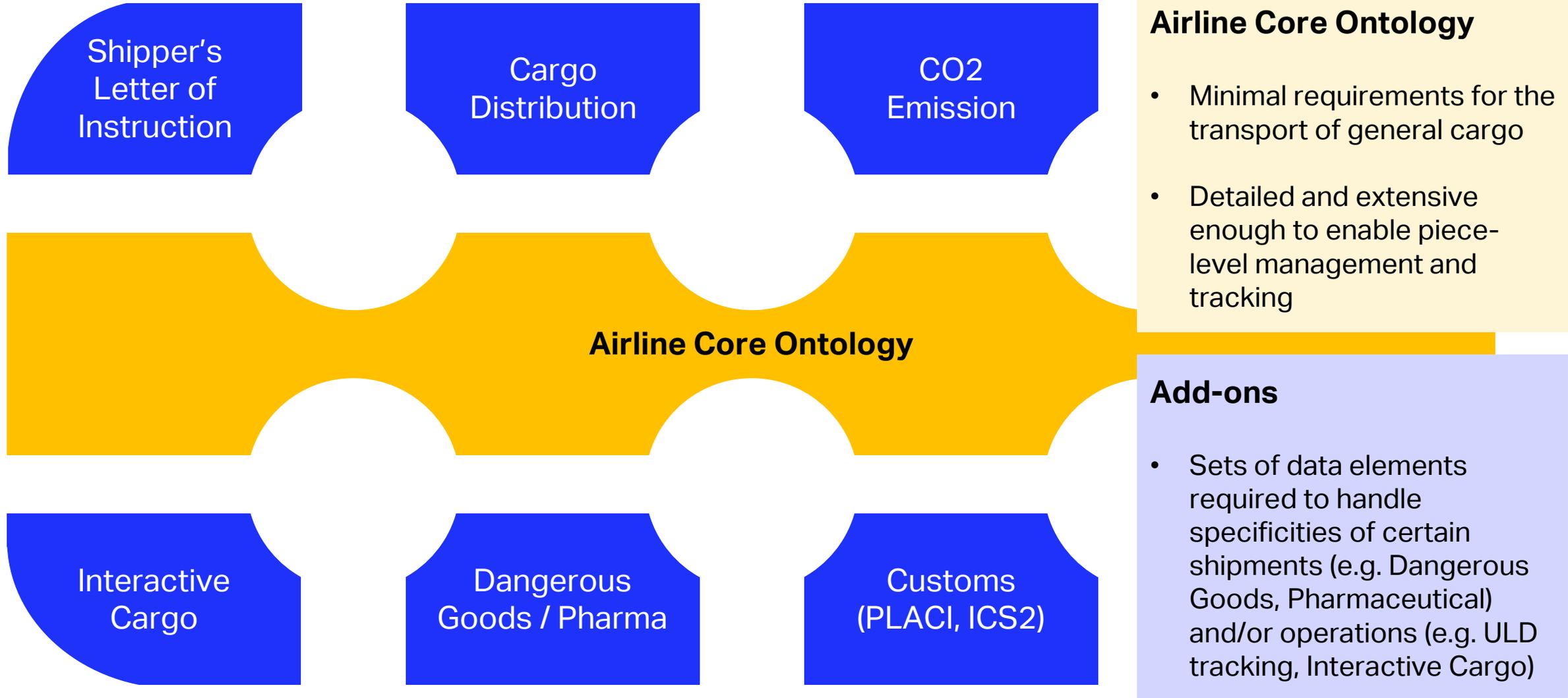
An airline wants to have access to the shipment record of a particular AWB



# ONE Record Data Model: the ambition

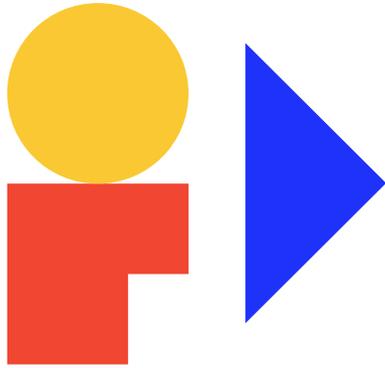


# ONE Record Data Model: the ambition



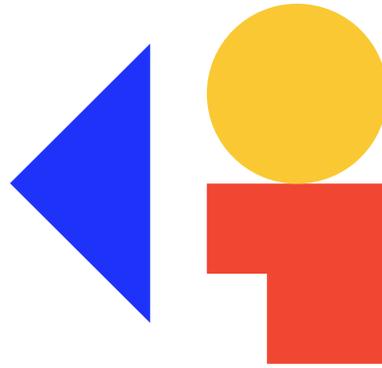
# ONE Record / Security

The security of ONE Record relies on 3 components:



## IDENTIFICATION

Who are you?



## AUTHENTICATION

Are you who you claim to be?

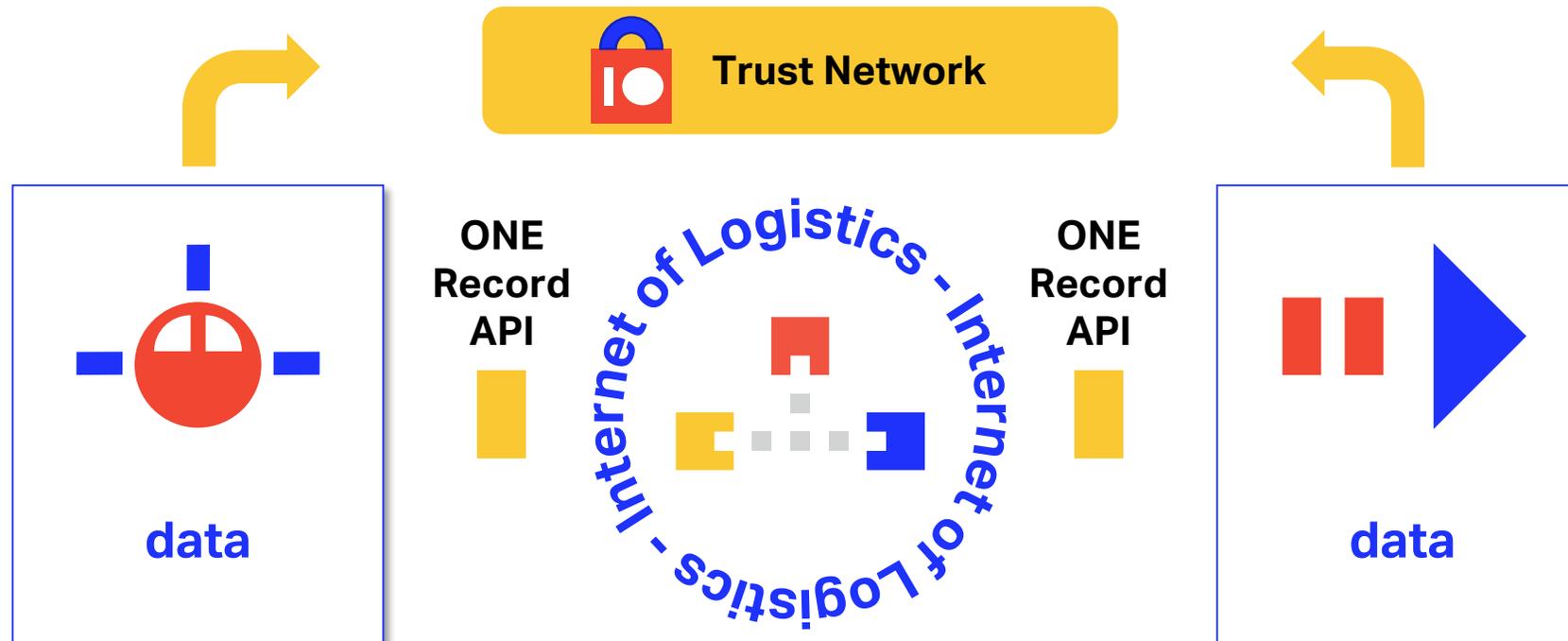


## AUTHORIZATION

Do you have the right credentials?

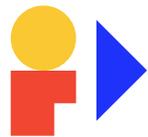
# ONE Record / Security

The security of ONE Record is managed through a Trust Network



# ONE Record / Security

The security of ONE Record is managed through a Trust Network



## IDENTIFICATION

- Register the ONE Record participant through a dedicated accreditation process
- Issue a ONE Record certificate as an identifier



## AUTHENTICATION

- Verify the validity of the ONE Record certificate



## AUTHORIZATION

- Managed by the data owners. Can grant access to specific companies or groups of companies

# ONE Record

is a  
**data-centric model**  
and NOT a  
**document-centric  
model**

Provide better  
visibility and  
transparency

Eliminate  
duplicate

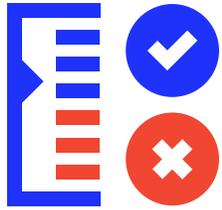
Improve  
data quality



# Industry benefits

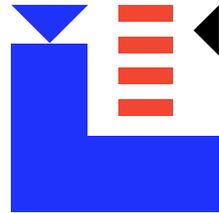


# Industry benefits



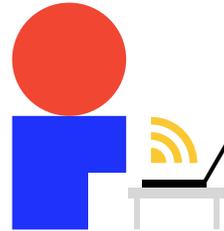
## Data quality and control

- Data shared by data owner
- Full control of data
- Data stays at the source
- Owner determines data access



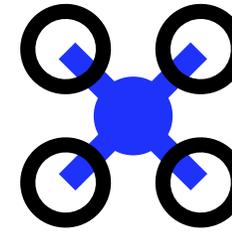
## Visibility and transparency

- End-to-end transportation chain
- Share data of the shipment with relevant parties
- Enhanced visibility and transparency



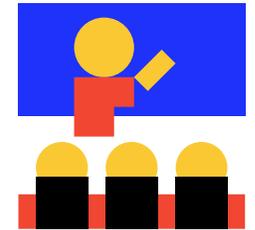
## Plug & Play Connectivity

- Facilitate the direct connectivity between all the stakeholders
- Use of web API
- New cooperative IT solutions and innovation



## Future of digital cargo

- Foundation for true digital air cargo
- Develop collaborative and automated digital services



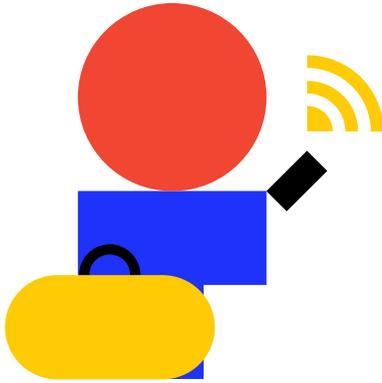
## Welcome a new generation

- Technology platform that is ready for a new generation of digital natives

# Key points

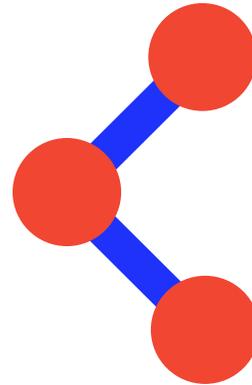


# Key points



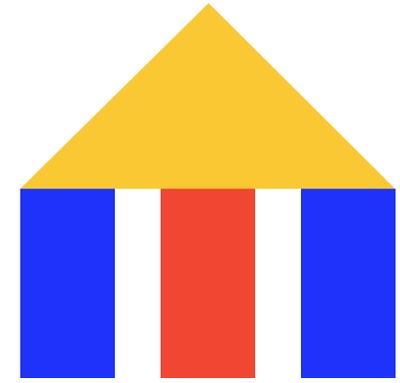
## DIGITALIZATION

- Complete digitalization of the global supply chain will happen
- The Internet of Logistics is a likely scenario



## AGILE SUPPLY CHAIN

- This will lead to new and dynamic supply chain configurations
- Speed and agility is key



## REGULATORS & AUTHORITIES

- Regulators and authorities will get high visibility and transparency
- The focus will shift to intelligence & collaboration

# ONE Record

*{ progress status; }*





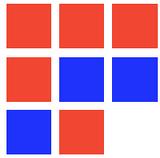
# ONE Record Task Force (ORTF) kicked off in June 2018

The Task Force is established under the Cargo Operations and Technology Board (COTB)

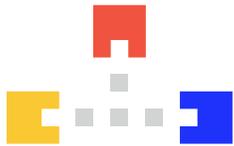


# Objectives

To provide the air cargo industry with a standard for data sharing



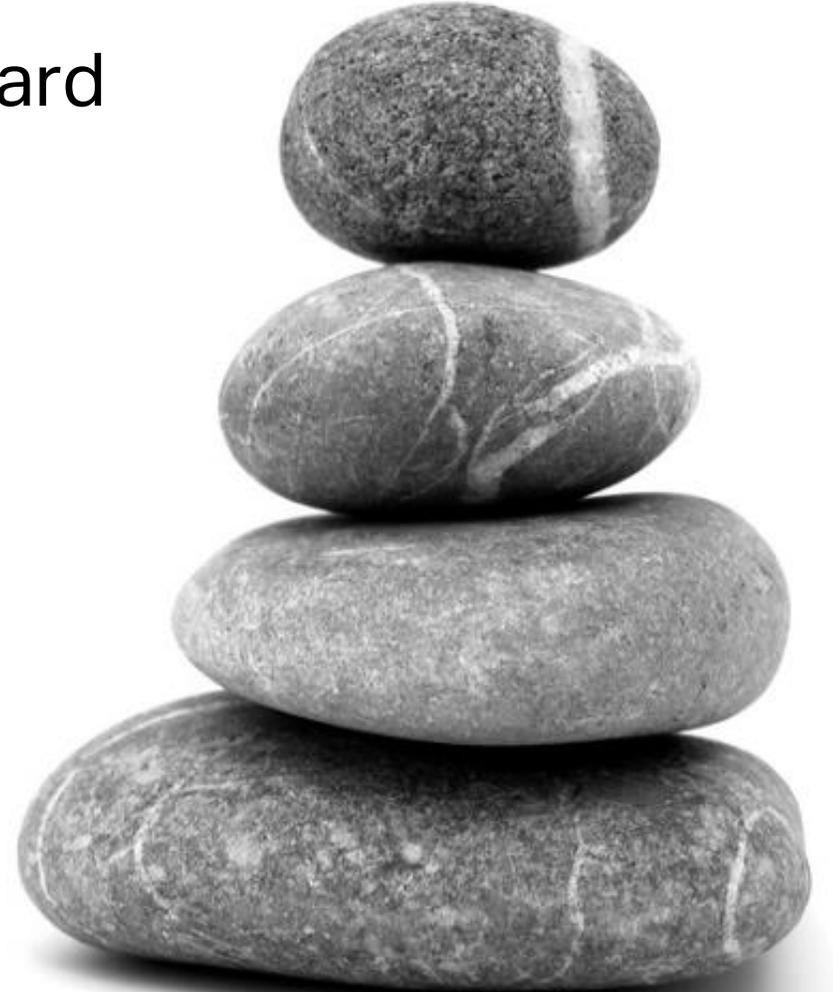
**Data model specification**



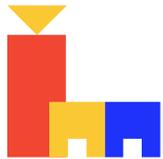
**API specification**



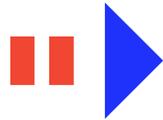
**Security specification**



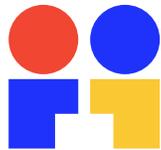
# ~60 participants from all the areas of the air cargo industry



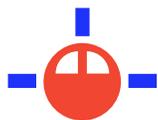
Shipper



Freight Forwarder



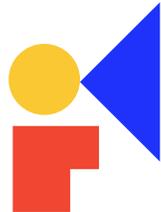
GSA



Airline



Ground Handler



Association



Customs



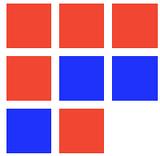
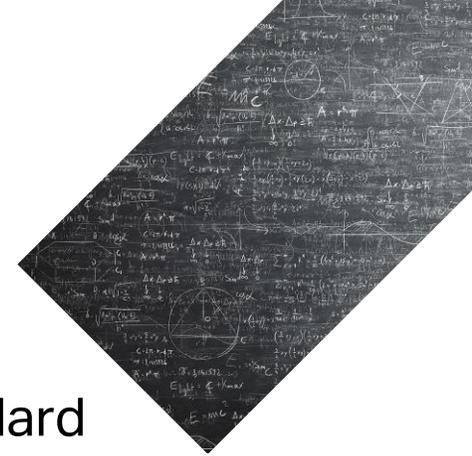
IT Provider



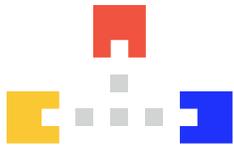
CCS



# Achievements



**Data model specification**: provides the air cargo industry with a standard data structure for data exchange using JSON-LD that facilitates data integration with existing and new data services;



**API specification**: specifies the interface and interaction of the web API or Application Programming Interface that allows airlines and their partners to connect their system directly using best in class web technologies;



**Security specification**: uses an industrywide and federated trust network to manage identification and authentication of data sharing systems and ensures data privacy and confidentiality for all parties.

<https://github.com/IATA-Cargo/ONE-Record>



# ONE Record 2020



# ONE Record

## Objectives for 2020

Validate the ONE Record standard through pilot projects and speed up its adoption with industry tools and support while continuously add data elements and features to the standard

Drive  
pilot projects  
with industry  
stakeholders

Develop a ONE  
Record Garage to  
host tools and  
support to  
accelerate the  
standard adoption

Enhance  
the ONE Record  
standard



# Activities for 2020

## Data Model

- 1 Finalize the core airline ontology
- 2 Expand the data model

## API

- 1 Develop "Experimental" API features to the "Proposed" stage
- 2 Deploy "Proposed" API features into pilot projects and drive to "Verified" stage
- 3 Document "Verified" API feature and drive to "Approved" stage
- 4 Identify and qualify new API feature to "Experimental" stage

## Security

- 1 Agree on the security requirements
- 2 Deliver PoC and make it available for pilot projects

## Pilot projects

- 1 Wrap up 2019 pilot projects and document take away and lessons learned
- 2 Identify and agree on use cases for 2020 pilot projects
- 3 Identify required data elements and API features
- 4 Call for pilot project teams

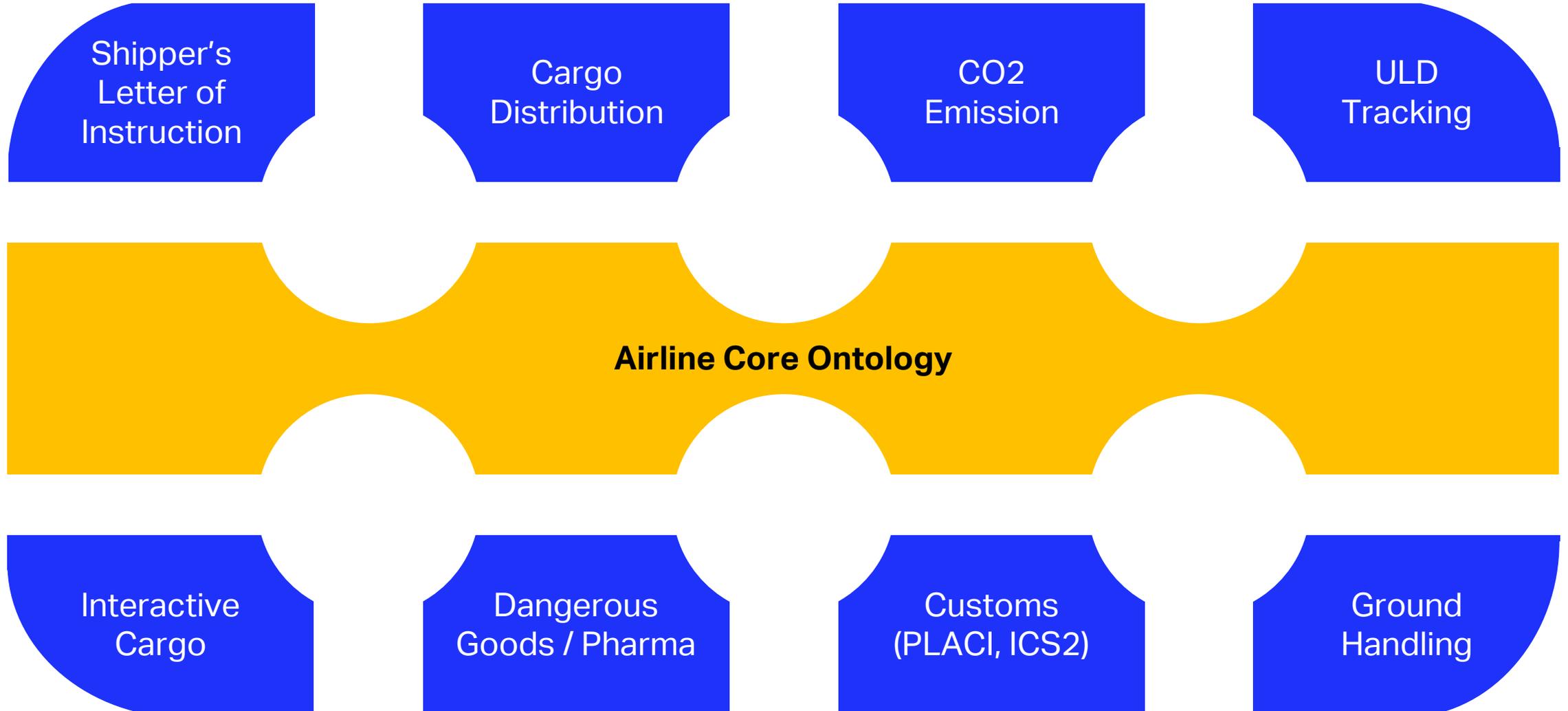
## Developer Portal

- 1 Developer Portal
- 2 ONE Record Compliance Checker
- 3 ONE Record Ontology tool
- 4 ONE Record Demonstrator
- 5 ONE Record Tool Shed
- 6 ONE Record Security Portal

# Data model

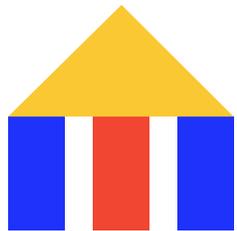


# ONE Record Data Model: the ambition

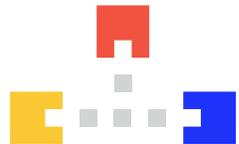


# Data Model: Standard components

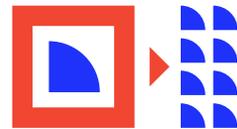
To support the deployment and the adoption of the ONE Record Data Model, IATA published a set of specification, guidance materials and tools



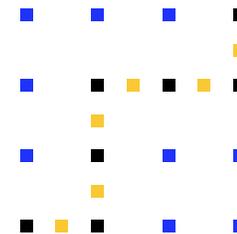
**Design  
Principles**



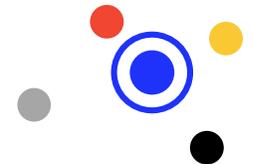
**Conceptual  
Data Model**



**Logical  
Data Model**



**Use Cases**



**Ontology**

<https://github.com/IATA-Cargo/ONE-Record/tree/master/March-2020-standard-COTB-endorsed/Data-Model>



# Design Principles



## ONE Record data model Design Principles

Version 1.0 – April 2020



1 ONE Record data model



Definition of the four **design principles**

Definition of the **logistic objects**

Application of the data model to the  
**Master AWB** and the **House AWB**

### What is a logistic object?

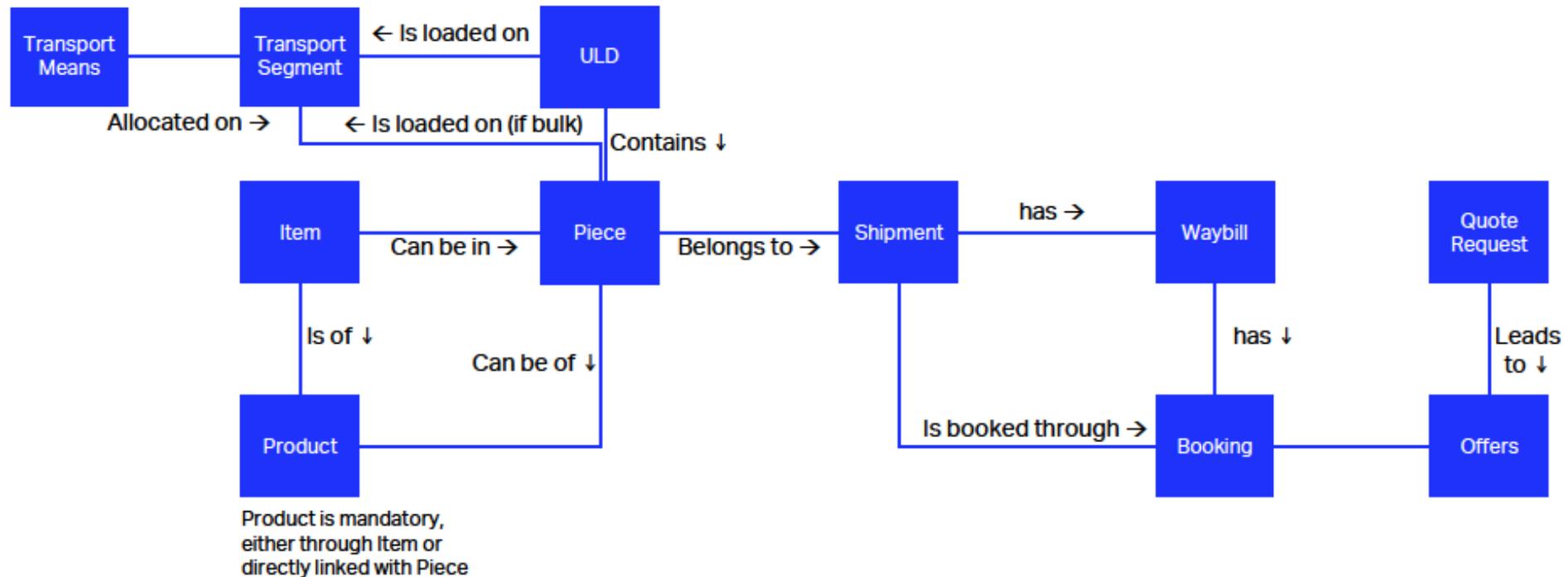
“ An essential element of the cargo supply chain  
e.g. digital twins, transport movements, etc. ”



# Conceptual Data Model



## ONE Record conceptual data model



# Logical Data Model



Design Principles



Conceptual Data Model



Logical Data Model



Use Cases



Ontology



Object_Type	Object	Attribute	Linked_Object	Description
Logistic Object	Offer	securityState	Servicerequest	Indicate the security state of the shipment, screen
Logistic Object	Offer	serviceRequest	Shipment	Reference to the Service requests of the quote re
Logistic Object	Offer	shipmentDetails	Specialhandling	Details of the shipment that is to be shipped
Logistic Object	Offer	specialHandling	TransportSegment	Special Handling details
Logistic Object	Offer	transportMovement	Value	Transport segment linked to the offer, including the
Logistic Object	Offer	units	Value	Units used for the offer
Logistic Object	<b>PackagingType</b>			<b>Packaging details</b>
Logistic Object	PackagingType	code		Packaging type identifier as per UNECE Rec 21 A
Logistic Object	PackagingType	description		If no Code provided, packaging type description
Logistic Object	<b>Piece</b>			<b>Individual piece or virtual grouping of pieces</b>
Logistic Object	Piece	additionalSecurityInfo		Ad hoc security statement required by state regula
Logistic Object	Piece	coload		Coload indicator for the pieces (boolean)
Logistic Object	Piece	containedPiece	Piece	Details of contained piece(s)
Logistic Object	Piece	customsInfo	CustomsInfo	Customs details
Logistic Object	Piece	dimensions	Dimensions	Dimensions details
Logistic Object	Piece	event	Event	Event details e.g. DEP, ARR, FOH, RCS, security
Logistic Object	Piece	externalReference	ExternalReference	Reference documents details
Logistic Object	Piece	goodsDescription		General goods description
Logistic Object	Piece	grossWeight	Value	Weight details
Logistic Object	Piece	loadType		Specify how the piece will be delivered (bulk or UL
Logistic Object	Piece	otherIdentifier	OtherIdentifier	Other piece identification ( e.g. Shipping Marks, S
Logistic Object	Piece	otherParty	Company	Other party company details - e.g. the party to be
Logistic Object	Piece	packagingType	PackagingType	Packaging details
Logistic Object	Piece	product	Product	Product of the piece, mandatory when there are n
Logistic Object	Piece	productionCountry	Country	Goods production country, mandatory when there
Logistic Object	Piece	securityStatus	SecurityStatus	Security details
Logistic Object	Piece	serviceRequest	ServiceRequest	Service Requests
Logistic Object	Piece	shipper	Company	Shipper company details - e.g. the party shipping t
Logistic Object	Piece	sLAC		Shipper's Load And Count ( total contained piece
Logistic Object	Piece	specialHandling	SpecialHandling	Special Handling details
Logistic Object	Piece	stackable		Stackable indicator for the pieces (boolean)
Logistic Object	Piece	transportSegment	TransportSegment	Transport segments related to the piece(s)
Logistic Object	Piece	turnable		Turnable indicator for the pieces (boolean)
Logistic Object	Piece	uLDReference	ULD	ULD on which the (virtual) piece has been loaded i
Logistic Object	Piece	uPID		Unique Piece Identifier (UPID) of the piece (Refer
Logistic Object	Piece	volumetricWeight	VolumetricWeight	Volumetric weight details
Logistic Object	<b>Price</b>			<b>Price associated to the offer/booking</b>
Logistic Object	Price	grandTotal		Total price
Logistic Object	Price	ratings	Ratings	Rating used for pricing
Logistic Object	Price	validTo		Terms of validity
Logistic Object	<b>Product</b>			<b>Product details</b>
Logistic Object	Product	characteristics	Characteristics	Charateristics of the product
Logistic Object	Product	commodityCode		Unique Commodity Code e.g. 391721 - Tubes, Pip
Logistic Object	Product	commodityDescription		Commodity description
Logistic Object	Product	commodityName		If no Code provided, name of commodity
Logistic Object	Product	commodityType		Issuer of the Commodity Code - e.g. Brussels Tar

# Use Cases



Design Principles



Conceptual Data Model



Logical Data Model



Use Cases



Ontology

## ONE Record - Data Model and MOP mapping

1. Select a task from the Master Operating Plan (MOP)

Activity	1 Book & plan shipments
Task	1.1 Receive booking from shippers' request & check security status
Go to MOP document	<a href="#">Click here to see the complete description</a>

2. The stakeholder presented below is the one accountable to make the data available. However other parties (not specified here) can be designated to perform this action (e.g. GHA on behalf of the airline)

Stakeholders	Shipper
--------------	---------

3. The below sections presents the Logistic/Common object to be created and a description of what need to be done during this specific tasks

Logistic Object	Common Object	Action / Comment
<a href="#">Characteristics</a> <a href="#">CustomsInfo</a> <a href="#">DangerousGoods</a> <a href="#">Item</a> <a href="#">PackagingType</a> <a href="#">Piece</a> <a href="#">Product</a> <a href="#">ReasonsForSecurityStatus</a> <a href="#">ReceivedFrom</a> <a href="#">SecurityStatus</a> <a href="#">ServiceRequest</a> <a href="#">TransportSegment</a> <a href="#">ULD</a>	<a href="#">Company</a> <a href="#">Country</a> <a href="#">Dimensions</a> <a href="#">Event</a> <a href="#">ExternalReference</a> <a href="#">Location</a> <a href="#">OtherIdentifier</a> <a href="#">Person</a> <a href="#">Value</a> <a href="#">VolumetricWeight</a>	<p>The booking is made between the shipper and the forwarder, at this stage this booking is not in the scope of the data model.</p> <p>The shipper ensures that the following LO are created or updated for the shipment: Product, Item, Piece, Dangerous Goods, Transport Segment (Origin and Destination, reference to the pieces), ULD if relevant (creating/updating if he is the owner, linking to existing ULD object otherwise), Security Status, Customs information, Service Request</p> <p>In this list the following are optional objects that are not mandatory at this stage: Item, ULD, Security Status, Customs information</p> <p>If there is no Item, the Product is directly linked to the Piece</p>

## ONE Record - Data Model and MOP mapping

Object name	Piece	Back to "MOP vs Data Model" screen
Object type	Logistic Object	

Data type: (O - Object, E - Embedded object, N - Numeric, D - DateTime, T - Text)

Attribute	Description	Optional or Mandatory	Cardinality	Data Type	Linked object
additionalSecurityInfo	Ad hoc security statement required by state regulators	0	n	T	
coload	Coload indicator for the pieces (boolean)	0	0	B	
containedPiece	Details of contained piece(s)		n	E	Piece
customsInfo	Customs details	0	n	E	CustomsInfo
dimensions	Dimensions details			E	Dimensions
event	Event details e.g. DEP, ARR, FOH, RCS, security screening, customs status, etc.	0	n	E	Event
externalReference	Reference documents details		n	E	ExternalReference
goodsDescription	General goods description	M		T	
grossWeight	Weight details	M		E	Value



# Ontology



Design Principles



Conceptual Data Model



Logical Data Model



Use Cases



Ontology

The screenshot shows the Protégé ontology editor interface. The main window displays the details for the class 'Piece' (URI: https://onerecord.iata.org/Piece). The left sidebar shows a class hierarchy starting with 'owl:Thing'. The main area shows the 'Description: Piece' section, which lists 'Equivalent To' and 'SubClass Of' relationships. The 'SubClass Of' list includes various subclasses such as 'piece:additionalSecurityInfo', 'piece:cofload', 'piece:containedPiece', etc. The bottom status bar shows 'Git: master' and 'To use the reasoner click Reasoner > Start reasoner'.

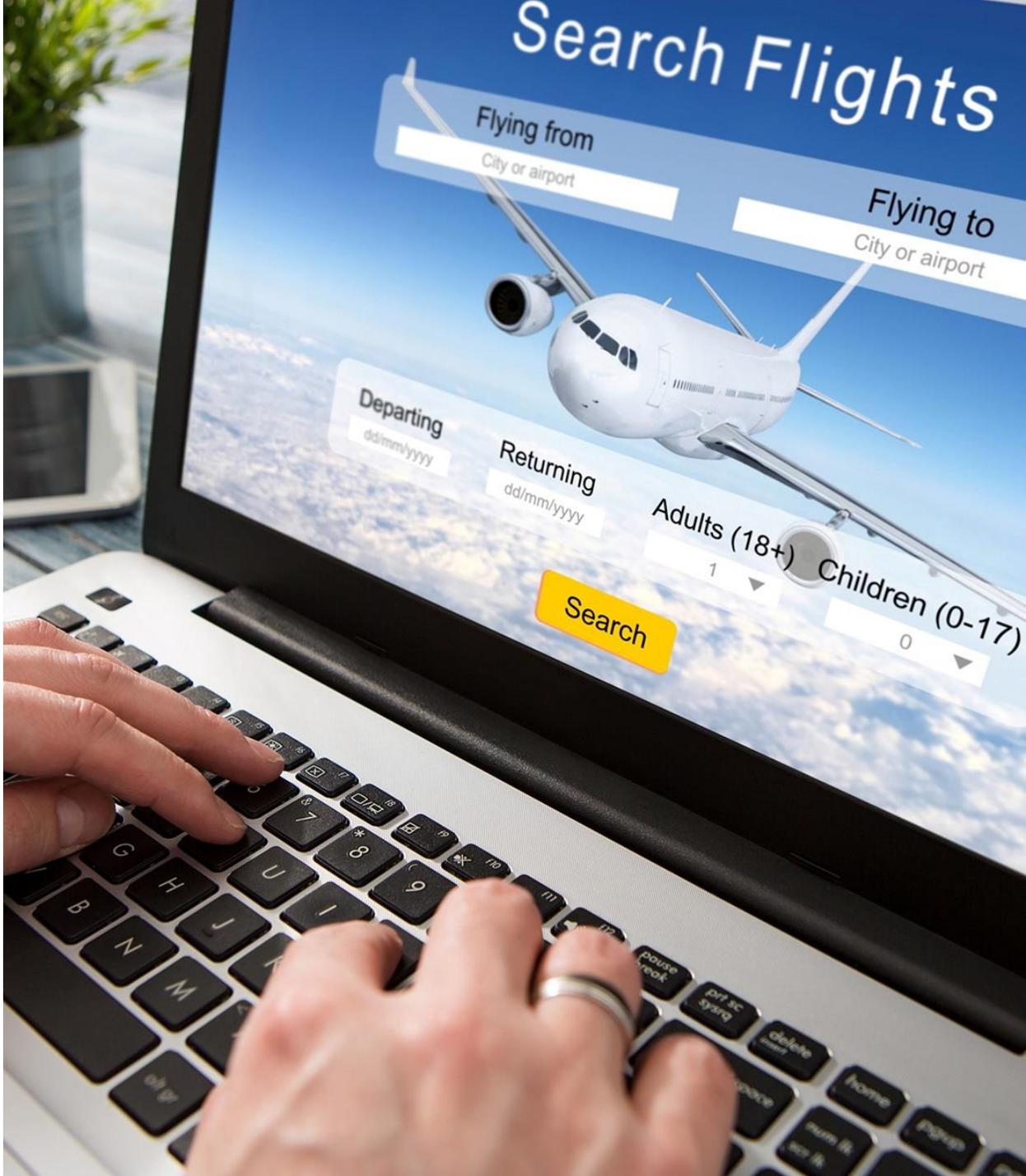


Developed by the Stanford Center for Biomedical Informatics Research at the Stanford University School of Medicine, Protégé tool is one of the oldest and most widely deployed ontology modelling tools. It was originally conceived as a frame-based modelling tool for rich ontologies following the Open Knowledge Base Connectivity protocol. Later iterations of Protégé have expanded to include a plug-in that is now widely used for OWL and RDF modelling.

<https://protege.stanford.edu/>



# API & Security





# ONE Record API

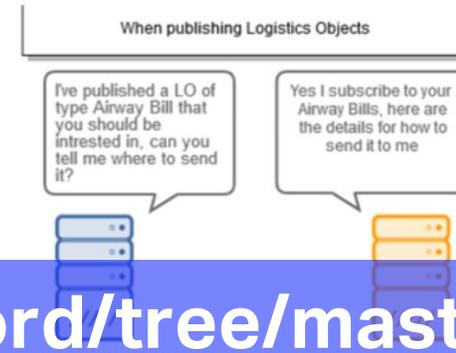
Reference Specification – draft 2.0

October 4, 2019

Note on this draft

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Note: The answer received can be cached for a period to avoid asking this question for every LO

<https://github.com/IATA-Cargo/ONE-Record/tree/master/March-2020-standard-COTB-endorsed/API-Security>

# ONE Record pilots





**40+ companies  
involved in ONE Record**



Standard  
Development  
Bootcamp



HACKATHON  
11-13 September

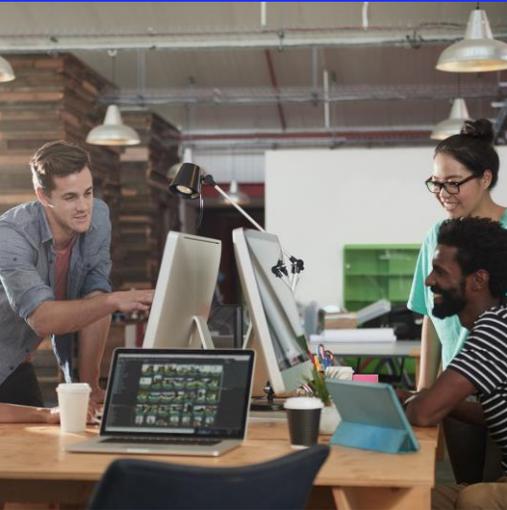
SPONSORED BY  
 Riege  
Software

ONE Record  
Webinars

Digital Cargo  
Conference  
2020

Week of 14-18 Sept.

ONE Record  
website and  
GitHub  
repository



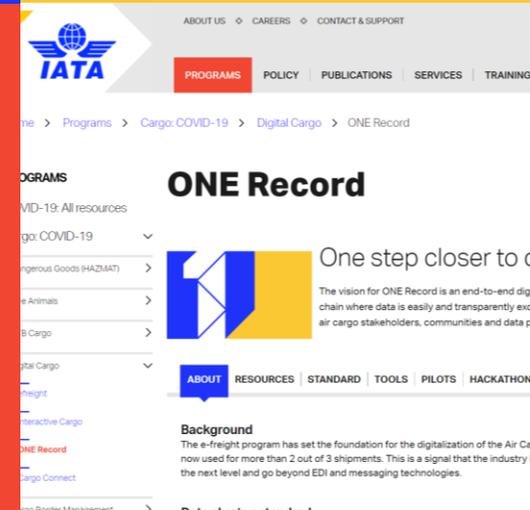
Cargo  
Hackathon

IATA WEBINAR

ONE Record  
Insights

Series of 6 webinars, every Tuesday from  
23 June to 28 July, 11:00 to 12:30 CEST

Digital Cargo  
Conference



Industry engagement & communication



**21-24 October 2019**  
**Data Model**  
**Boot Camp #1**



**API & Security**  
**Boot Camp**  
9-12 September 2019



**Data Model**  
**Boot Camp #2**  
28-30 January 2020

**ONE Record Boot Camp**



**Geneva**  
14-16 September  
2018

**21-23 June  
2019  
Madrid**



# ONE Record Hackathon

# ONE Record Insights

# IATA WEBINAR

## Episode 2

**The data model: a digital twin of the air cargo industry**  
Tuesday, 30th June 11:00 – 12:30 (CEST)

## Episode 3

**Crafting ontologies: from physical freight to machine readable data**  
Tuesday, 7th July 11:00 – 12:30 (CEST)

## Episode 4

**The ONE Record API: an overview of the key features**  
Tuesday, 14th July 11:00 – 12:30 (CEST)

## Episode 5

**Data security: securing the Internet of Logistics**  
Tuesday, 21st July 11:00 – 12:30 (CEST)

## Episode 6

**Pilot testing: engaging with the cargo community**  
Tuesday, 28th July 11:00 – 12:30 (CEST)





PROGRAMS

COVID-19: All resources

Cargo: COVID-19

Dangerous Goods (HAZMAT)

Live Animals

STB Cargo

Digital Cargo

e-freight

Interactive Cargo

ONE Record

Cargo Connect

Cargo Border Management

Cargo Operations

Cargo IQ

Pharma & Healthcare

Unit Load Devices

Perishables

Cargo Agency Program

Cargo Sustainability

# ONE Record



## One step closer to digital cargo

The vision for ONE Record is an end-to-end digital logistics and transport supply chain where data is easily and transparently exchanged in a digital ecosystem of air cargo stakeholders, communities and data platforms.

- ABOUT
- RESOURCES
- STANDARD
- TOOLS
- PILOTS
- HACKATHON

### Background

The e-freight program has set the foundation for the digitalization of the Air Cargo industry and the e-AWB is now used for more than 2 out of 3 shipments. This is a signal that the industry is ready to take digitalization to the next level and go beyond EDI and messaging technologies.

### Data sharing standard

ONE Record is a standard for data sharing and creates a single record view of the shipment. This standard defines a common data model for the data that is shared via standardized and secured web API.

The standard is based on mature but progressive data sharing technologies that are well aligned with the best practices used by leading airlines. This makes it directly accessible to IT teams and service providers.

### The standard specifies

- Data model specification:** provides the air cargo industry with a standard data structure for data exchange using JSON-LD that facilitates data integration with existing and new data services;
- API specification:** specifies the interface and interaction of the web API or Application Programming Interface that allows airlines and their partners to connect their system directly using best in class web technologies;

### Need Help?

Contact us

### ONE Record Standard

GitHub repository

### Related Links

ONE Record Standard Development Dashboard

(pdf)

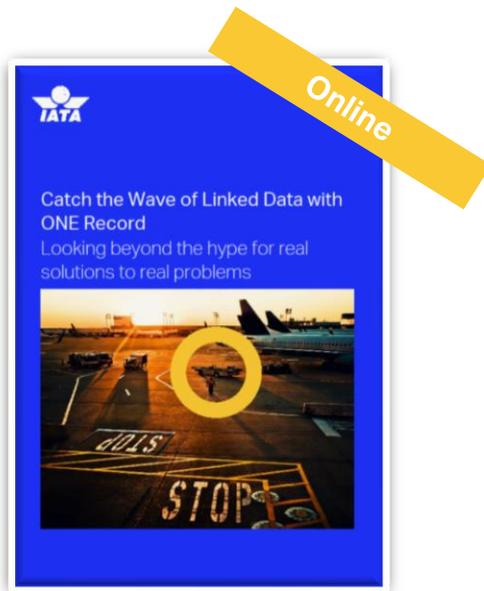
Hackathon interviews

Download PNG ONE Record logo

<http://iata.org/one-record>

# ONE Record White Papers

Don't miss our series of three white papers coming this summer !



**ONE Record  
Data Model**



**ONE Record  
API**



**ONE Record  
Security**

<https://www.iata.org/one-record/#tab-2>



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This repository contains the data model for the ONE Record specification

323 commits 1 branch 0 packages 0 releases 5 contributors MIT

Branch: master New pull request Find file Clone or download

	Merge pull request #63 from IATA-Cargo/add-memento-models	Latest commit a51de26 22 days ago
CSC_adopted_March_2019	Remove piece_grouping_totals	11 months ago
March-2020-standard-for-COTB-endorsement	Revised version	last month
working_draft	Add memento models	22 days ago
.gitignore	Add SHACL version of the ontology	6 months ago
LICENSE	Create LICENSE	9 months ago
README.md	Add working draft folder	11 months ago

README.md

<http://github.com/IATA-Cargo/ONE-Record>

# Thank You

More info

[www.iata.org/one-record](http://www.iata.org/one-record)

