ONE Record Data Model
A digital twin of the air 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.

ONE Record is driven by the need of digitalization of the air cargo industry to achieve operational excellence through optimized data sharing and lean business processes while reducing the usage of paper document.

Why a data model?

As ONE Record intends to define a data sharing standard allowing the deployment of a network of plug and play platforms, it is essential to define a standard data model that can be used and understood by any stakeholder in the industry. The data model that has been designed with a group of industry stakeholders aims to:

- Cover the end-to-end supply chain of goods transportation, including the possibility to integrate multi-modal transportation means;
- Find the optimal balance in simplicity, flexibility and robustness of the data model to ensure that all required data is captured and shared;
- Optimize the usage of modern technologies to facilitate and secure data exchange through APIs, state of the art security mechanisms, etc;
- Optimize data and minimize redundancy.

The data model will be transcribed into an ontology to facilitate its understanding and implementation.

How is it designed?

Four core design principles have been defined to design the ONE Record data model.

Piece Centric   Physics Oriented   One Single Source of Truth   Data Driven

Piece-centric

As defined by the IATA Recommended Practice 1689, a piece is "a uniquely identified physical single unit which may form all or a part of a shipment". Pieces are at the center of the data model.

Physics-oriented: the digital twin concept

What does the digital twin concept mean? A digital twin is the "digital replica" of a physical entity, it can be applied to physical objects, processes, systems, etc. In short anything that exists in the physical world, as opposed to the digital world, can have a digital twin.

Using digital twins facilitates the understanding of the data model and ensures that physical constraints and requirements are considered. Furthermore, the digital assets are accessible anywhere and allow for more reliable and real-time tracking through the supply chain.

One single source of truth

The data stays at the source and clear data ownership ensures its integrity and accuracy, increasing trust in the use of data over paper.

Data-driven

The model has been designed around data, not physical documents. All documents, especially the ones that are legally binding, can be easily created with all the required information and the appropriate level of security and trust it implies.

With the correct usage of web technologies and standard mechanisms, as defined and described in the API & Security specifications of ONE Record, **linked data** enables to connect and query data from different sources.

- The Airline Core Ontology (in yellow below) represents the minimal requirements for the transport of goods, it is detailed and extensive enough to enable **piece-level management and tracking.**

- Additional add-ons (in blue below) define sets of data elements required to handle specificities of certain shipments (e.g. Dangerous Goods, Pharmaceutical) and/or operations (e.g. ULD tracking, Interactive Cargo).

What is the scope?

In order to capture the end-to-end supply chain, the scope has been split into multiple parts:
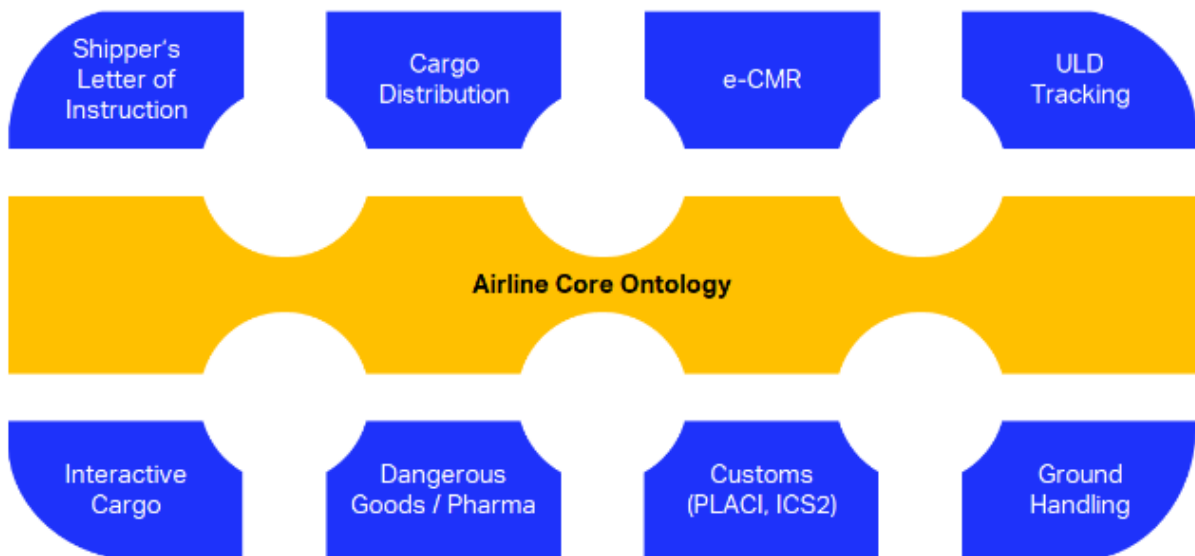

Figure 1 - Scope of the ONE Record data model

How is this model applied to the air cargo industry?

Air cargo is about physically moving goods, it includes physical assets such as the goods being transported or the means of transportation themselves. With this aspect in mind, the data model intends to reflect as much as possible the physical world using the digital twin concept.

Data objects that are essential to the air cargo are called Logistic Objects, or "LO". The ONE Record data model focuses on defining these LO and how they interact with each other:

- Physical assets are explicitly transcribed, for instance: pieces, shipments, ULDs, transportation means or transport segments;
- Paper documents such as the Master Air Waybill or the House Air Waybill are also represented by a dedicated Waybill object
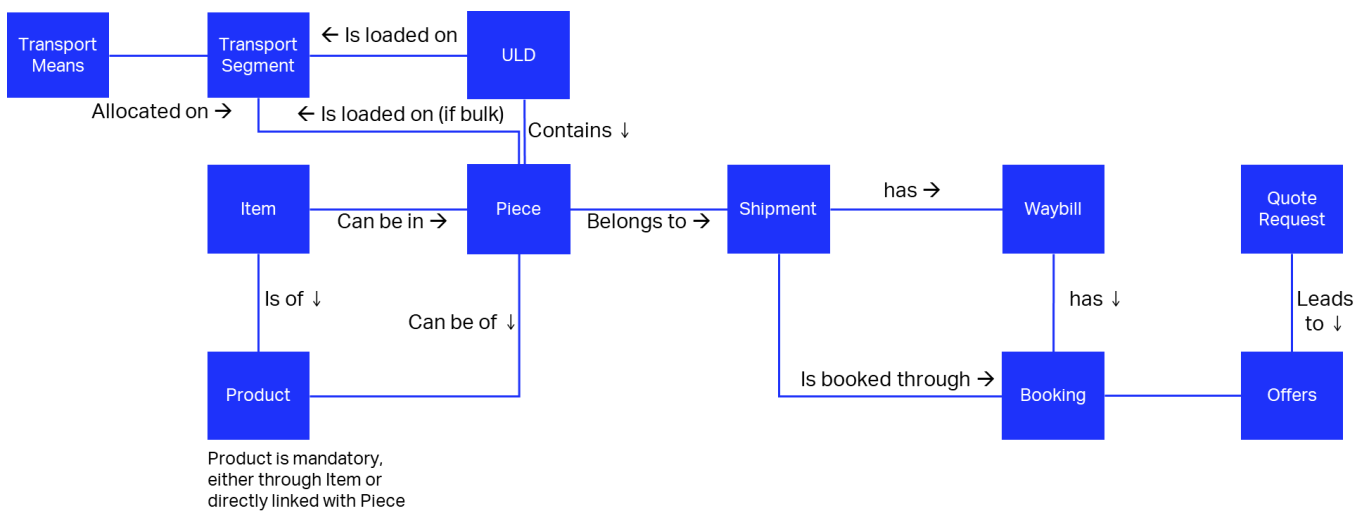
Figure 2 - High level ONE Record data model

Conclusion

The ONE Record data model captures the air cargo data requirements whilst being its digital twin. The dedicated task force with industry stakeholders managed to produce a first version that will evolve over time, especially as the business needs may change and as the ONE Record pilots throughout the world will provide precious feedbacks on how the data model works in real-life conditions and how it can be properly implemented.

More information at https://www.iata.org/one-record