



Baggage Information eXchange Implementation Guide



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1. Executive Summary

In 2023, 36.1 million bags were mishandled, a rate of 6.9 per thousand, which equals to US \$3.6 bn the cost for the industry. There are growing efforts to address this issue and over the past years the introduction of IATA's Resolution 753 has seen airports and airlines implement systems to enable bag tracking throughout the handling process. This Resolution has enabled a positive step towards providing greater visibility of baggage throughout processing, and a reduction in the rate of mishandled bags.

Baggage messaging is the communication between airlines and airports that supports the transit of bags from origin to destination. With increasing bags and passengers comes greater need to communicate and interpret this information. Baggage mishandling is often caused or linked to baggage message failures or rejections.

The current messaging standards, which have been in place since 1985, is centrally managed and not easily accessible, creating additional cost burdens to airlines. The current messaging standard also do not provide an easy way to support baggage system integration and innovation. Implementing standardized messaging processes has the potential to make these communications accessible and intelligible for all relevant stakeholders.

The rules governing the practices and development of XML (Extensible Markup Language), are defined by W3C (World Wide Web Consortium), a respected international body that is not aligned to any vendor or product. The advantage of XML is through enabling much simpler processing to take place, making the task of "parsing" the information (putting it into a form that is usable by the receiving device) unnecessary. Once a message is created in XML, all the devices in an enterprise (or wider environment if the same information structure is adopted extensively) can carry out their work simply, without having to reinterpret the message from scratch. XML is also inherently protected against becoming obsolescent, because the structure allows for extension, when new practices require new information to be carried.

Also, any new standards of Baggage messaging (XML, JSON or other equivalent languages) are being implemented based on IATA Airline Industry Data Model (AIDM), making it easier for the Airlines, Airports and Baggage handling vendors in the industry to understand and communicate baggage information with clarity.

Transitioning from type B to modern messaging is one of the key priorities of IATA which is monitored by the board of governors.

This implementation guide has been written by members of the IATA Baggage Information eXchange sub-group and was endorsed by IATA Baggage Steering Group. It is a living document which will be periodically updated.

It is important to remember that this document is intended to provide guidance on different levels of Baggage Information eXchange implementation. It is a guide; it is not a set of instructions. Many of the recommendations in this document might not be appropriate for every airline or airport. Stakeholders should analyse their baggage operation before embarking on the implementation of the recommendations in this guide.



2 Related IATA Documents

IATA Passenger Services Conference Resolutions Manual:

- Resolution 740 Form of Interline Baggage Tag
- Resolution 751 Use of the 10 Digit License Plate
- Resolution 753 Baggage Tracking
- Resolution 780 Form of Interline Traffic Agreement-Passenger
- RP 1745 Baggage Information Messages
- RP 1745A Automated Baggage Handling Based on the Messaging of RP 1745
- RP 1755 Baggage Logistics and Conformance Event Services

IATA Baggage Reference Manual

Available for download on www.iata.org:

- Baggage Tracking Implementation guide
- **Baggage Information eXchange Implementation Guide** (this document)
- **IATA_Baggage_ XML schema** (9 together)

3 Baggage Handling Overview

3.1 Introduction

This chapter will be of particular interest to Airlines, Baggage Handlers, and Baggage Systems personnel, who would like to understand the functions/activities in the context of the Baggage Information Exchange. Detailed guidance is provided on the Baggage Main Processes, Baggage Journey and Baggage Handling functions with associated roles and message types. This will enable interested parties to understand better:

- How Baggage Journey relates to Main Baggage Processes
- What each function/activity means in the context of Baggage Journey steps, and how they can be mapped onto an existing organization's processes and procedures.
- What each role represents, and how they can be mapped onto an existing organization's roles, which are likely to have widely varying titles and responsibilities.
- What each baggage message type means, and under what circumstances they should be produced.

3.2 Baggage Handling

In the wider context, Baggage Handling covers the entire journey of the held bag from the Passenger's starting location to their final destination. Traditionally, Passengers would take their own bag to the Airport and drop it off at the check-in desk when checking in for a flight. The Airline would take custody of the bag and send it through the Airport baggage handling system to be delivered to the aircraft. At a transfer Station baggage handlers unload the baggage from arriving flight and handover custody of transferring bags to departing bag handlers. In the departure flow transfer bags merge with local originating bags to be loaded on aircraft. At final destination baggage would be unloaded and separated in terminating bags versus transferring bags. Terminating bags are presented to Passengers for collection in the Bag Claim area, thus ending the custody.

Since long, bags are segregated prior to loading, and packed into hold compartments or ULD according to this segregation. A standard split is between bags that travel to one destination or a second destination on a multi-leg flight. Another standard split is to separate between terminating bags at destination and transfer bags as the two categories follow a different main process. For bags traveling in bulk (loose load) the segregation is persisted with baggage carts between terminal and aircraft and by using dedicated hold compartments. For containerized travel, bags are packed into ULD in the make-up area in the terminal.

Increasingly, services are being introduced to offer flexibility and convenience for the Passenger. Courier services offer to pick up a bag at home and deliver it to the final destination. Other services are being offered, such as off-Airport drop off facilities at hotels, train stations and post offices. Within the Airport itself, facilities can be provided at car parks or bus stations. More use is being made of bag drop facilities within the Airport, rather than the check-in desk itself, as many Passengers will already have checked in online. Some of these facilities may be dedicated to an Airline, others will be shared between a number of Airlines.

In another development Crew bag processing is increasingly merged with Passenger bag processing although drop-off and collection-points tend to remain separated.

Whichever service is used, and whichever route is taken by the bag, it is very important to ensure that the bag travels securely from start to its final destination. This typically involves multiple parties who may be in control of the bag at various times, and who rely on accurate and complete information about the bag.

At its core, baggage handling is about moving the bag from pick up to its final delivery point ('Logistics') and ensuring that it is safe and secure at all times ('Conformance') while leveraging scale where possible. This requires a great deal of information to be shared between the various parties responsible for handling the bag, cart and ULD. These capabilities, and the information they require, are described in detail in the following sections.

3.3 User Stories

Various parties are involved in the management, transportation and security of bags from pickup to final delivery. In the context of Baggage Handling, these parties are:

Actor Name	Description	Notes
Passenger, Crew member	Party responsible for providing the bag at the start of the journey and reclaiming the bag at the end of the journey.	
Airline	Party responsible for transporting Passengers and bags from origin to destination with assistance of Crew	
Check-In Agent	Party responsible for checking in Passengers' or Crew hold baggage.	
Baggage Handler	Parties responsible for transporting bags within Terminal and over Platform of the Airport.	
Baggage Handling System	Party responsible for the Baggage Handling System (mechanized transport and storage of bags in Terminal)	
Ground Handler	Party responsible for packing and transporting bags to and from the dispatch points and the aircraft.	
Screening Handler	Party responsible for screening hold baggage	
Regulatory Authority	Party responsible for specifying policies relevant to the safe and secure handling of bags, and for monitoring compliance against the policies.	

User stories describe the high level requirement of each party, and the desired outcome. The following shows some examples of how different parties require information on bags in order to achieve their desired outcomes. Note that these are examples only. The roles and the naming of roles will be different in different organizations, even within the same organization.

As an actor	Condition(s)	I would like to:	So that the desired outcome is achieved
As a Passenger, Crew Member	Who owns the bag	Have the Airline take custody of my bag	My bag is safely and securely delivered at my destination in a timely manner.
As an Airline (Check-In Agent)	Who is responsible for checking in a passenger bag	Uniquely identify the bag	The bag is formally associated with the passenger and can be tracked at all times.
As an Airline	Who wants to improve the passenger experience	Provide bag location information to our passengers through our mobile app	Passengers can be assured that their bag is safely loaded in the aircraft or delivered securely at the reclaim.
As an Airline	Who is responsible for compliance with IATA Res 753	Know the location and control of a bag	Every bag can be located correctly, and its controlling party is known at all times.
As BHS Operator	Who is responsible for safely and securely delivering bags to ground handlers	Know the identity, location and status of all bags at all times	All bags are properly delivered to their correct output point in a timely manner.
As the Regulatory Authority	Who specifies bag screening security policies	Know that the security policies are being adhered to	The security status of a bag is always known.

4 Baggage Processes

This chapter will be of particular interest to Airlines, Baggage Handlers, and Baggage Systems personnel, who would like to understand the processes and messages in the context of the Baggage Information Exchange. Detailed guidance is provided on the Baggage Main Processes, Baggage Journey and Baggage Handling functions with associated roles and message types. This will enable interested parties to understand better:

- How Baggage Journey relates to Main Baggage Processes and how Baggage Tasks fit in
- What each process classification means in the context of Baggage Journey steps, and how they can be mapped onto an existing organization's processes and procedures.
- What each role represents, and how they can be mapped onto an existing organization's roles, which are likely to have widely varying titles and responsibilities.
- What each baggage message type means, and under what circumstances they should be produced.

4.1 Overview

Baggage handling involves processes that support bags departing from their original location, arriving at the destination, and where applicable, arriving and departing at a station to transfer from one vehicle to another e.g. when a bag transfers from one flight to another. Often bags are moved in a baggage cart, or in a baggage ULD.

Throughout the journey, a bag, a baggage cart, a baggage ULD undergoes many different processes, usually under the control of multiple parties at different stages, which may include one or more of: the Passenger, Crew, Airline carrier, Baggage handler, Airport operator, Baggage security operators, Courier companies, Customs officials and other regulatory bodies.

Each party plays a significant role in the baggage journey. It is important to recognise that a particular organisation may play more than one role, or that different organisations may play the same role. E.g. in some Airports, the Airport operator provides the Baggage system as a community facility, in others, it is the Airline to provide; in some Airports Ground Handlers offer services, in others it is the Airline to provide the staff and resources.

In order to cater for the many different scenarios, generic roles have been defined. These can be carried out by a primary player or can be delegated to a qualified third party. These roles provide clarity on who has control and what is happening to the bag at any time.

In customer perspective the Airline is providing a service to the owner of a bag (Passenger or Crew Member): take custody of bag at departure to return bag to owner at arrival of journey. This service is realized with help of baggage handlers (mechanized baggage handling system, baggage screeners, baggage ground handlers) who together perform the baggage processes. A service delivery may require collaboration between multiple airlines when the journey is interline or even collaboration between multiple transportation service providers where journey is intermodal.

When a bag (or cart or ULD) is handed over between two handlers that work for same airline, "control over baggage item" is transferred. When a bag is dropped by owner to airline or handed over between two airlines in interline context, custody over the bag changes, conform Baggage Tracking Resolution 753. In exceptional cases one may see a baggage ULD being handed over between two airlines.

In the service provision to the customer, the Airline is bound to respect Personal Data confidentiality

In the process rendering of Handler to Airline, the Handler is bound to respect Commercial confidentiality towards the Airline including Personal Data confidentiality as instructed by the Airline. Interline (intermodal) arrangements determine how Data Security is managed between multiple transportation providers. Authorities may request Airlines for information as per applying regulations. As rule of thumb, handlers should not report on baggage to other parties than the custodian Airline (unless explicitly mandated by that Airline)

Next to guiding the Handler on handling the baggage, the custodian Airline may notify peering airlines and, subject to regulations, may be obliged to notify authorities

Airports usually are busy places so utilization of resource is an important consideration. Handlers may share baggage flow information amongst one another on condition it does not impact Personal Data or Commercial confidentiality

4.2 Three tiered Baggage Process

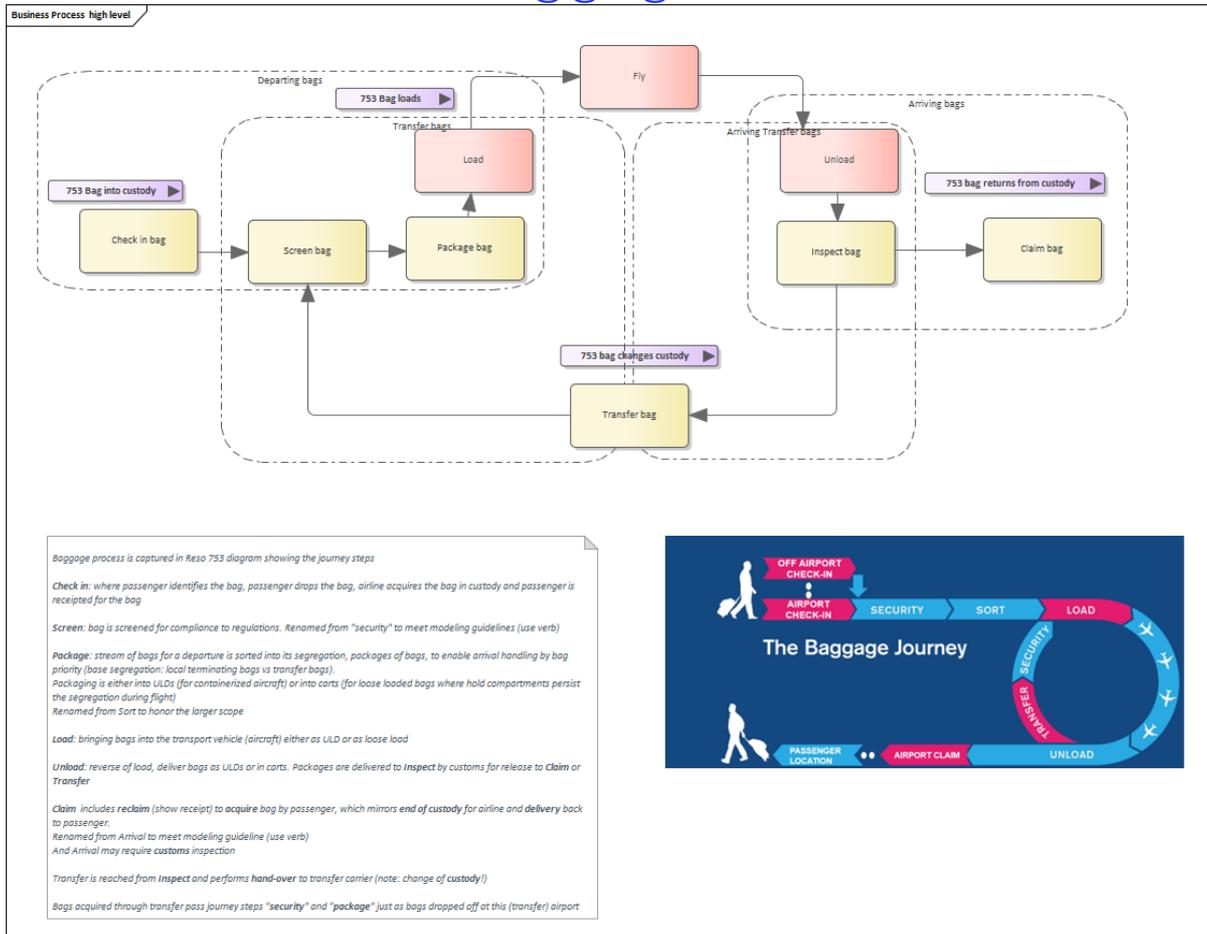


Figure 1 perspective of bag

Cart and ULD journeys are a subset from bag journey

Cart moves between makeup (Package) to be packed and aircraft stand (Load) to be merged. There is the reverse travel from aircraft stand (where cart is packed) to an injection point to terminal (where cart contents are merged into the terminal infrastructure). And in more exceptional cases a cart moves tail to tail.

ULD typically is packed in make-up area, loaded/flown/unloaded and then merged into terminal infrastructure. In exceptional cases a baggage ULD may arrive at Transfer Station, be handed over, and depart from Transfer Station (hub-container).

4.2.1 Tier one

The Baggage Processes at an Airport can be grouped along two axes: outbound or inbound transportation, and interaction with owner (passenger/crew).

This leads to the top level processes of

- Originating or Local joining baggage (acquired into airline custody from Passenger or Crew, loaded into a departing aircraft)
- Terminating baggage (unloaded from an arriving aircraft and returned from airline custody to Passenger or Crew)
- Arriving transfer baggage (unloaded from an arriving aircraft and delivered into airline custody of next interline airline in transfer)
- Departing transfer baggage (acquired into custody from delivering interline airline and loaded into departing aircraft)

4.2.2 Tier two

In another perspective bag, baggage cart or baggage ULD can be followed in its journey



For a bag

- Is Acquired through a check-in process or from transfer airline
- Is Screened on departure to enforce aviation security mitigations
- Is Packed into cart or ULD by segregation in the make-up area (to facilitate handling upon arrival)
- Is Loaded in an aircraft (usually brought to aircraft as a group of bags on a baggage cart or in a baggage ULD)
- Is Unloaded at arrival from aircraft (usually moved from aircraft to terminal in groups on carts or in ULD by segregation)
- Is Inspected in a customs process on arrival
- Is Delivered in a reclaim process or to a transfer airline

For a baggage cart the journey is much shorter as the cart does not leave the airport

- Is Packed with bags in make-up area (or under aircraft while unloading)
- Is Merged into aircraft (or other cart/container/injection point)

For an ULD the journey comprises

- Is Packed with bags in make-up area
- Is Merged into other cart/container/injection point
- Is Loaded into an aircraft
- Is Unloaded from an aircraft
- May be Screened on departure or Inspected on arrival in case of "hub container"
- May be unloaded at a transfer injection point for resortation

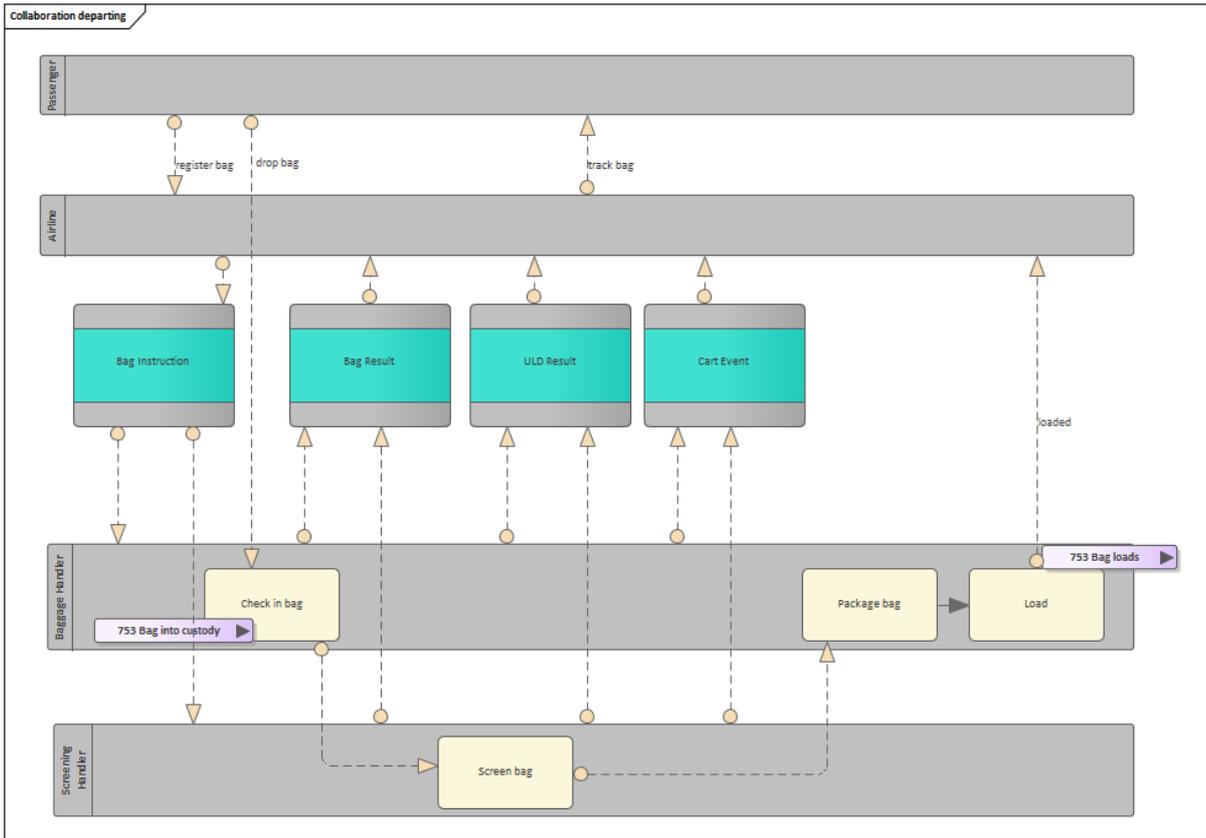
4.2.3 Tier three

Within the perspectives of Main Baggage Process and Baggage Journey one may distinguish tasks performed on a bag, a cart or an ULD as identified through the framework of logistics and conformance functions (see list of tasks in chapter 7 for details on recommended values; the messaging standard allows for customization here)

4.3 Tier one and baggage journey steps

4.3.1 Originating Departure

The Originating Departures use case comprises of two primary actors, the Airline and the Passenger. The Airline delegates physical rendering to handling parties



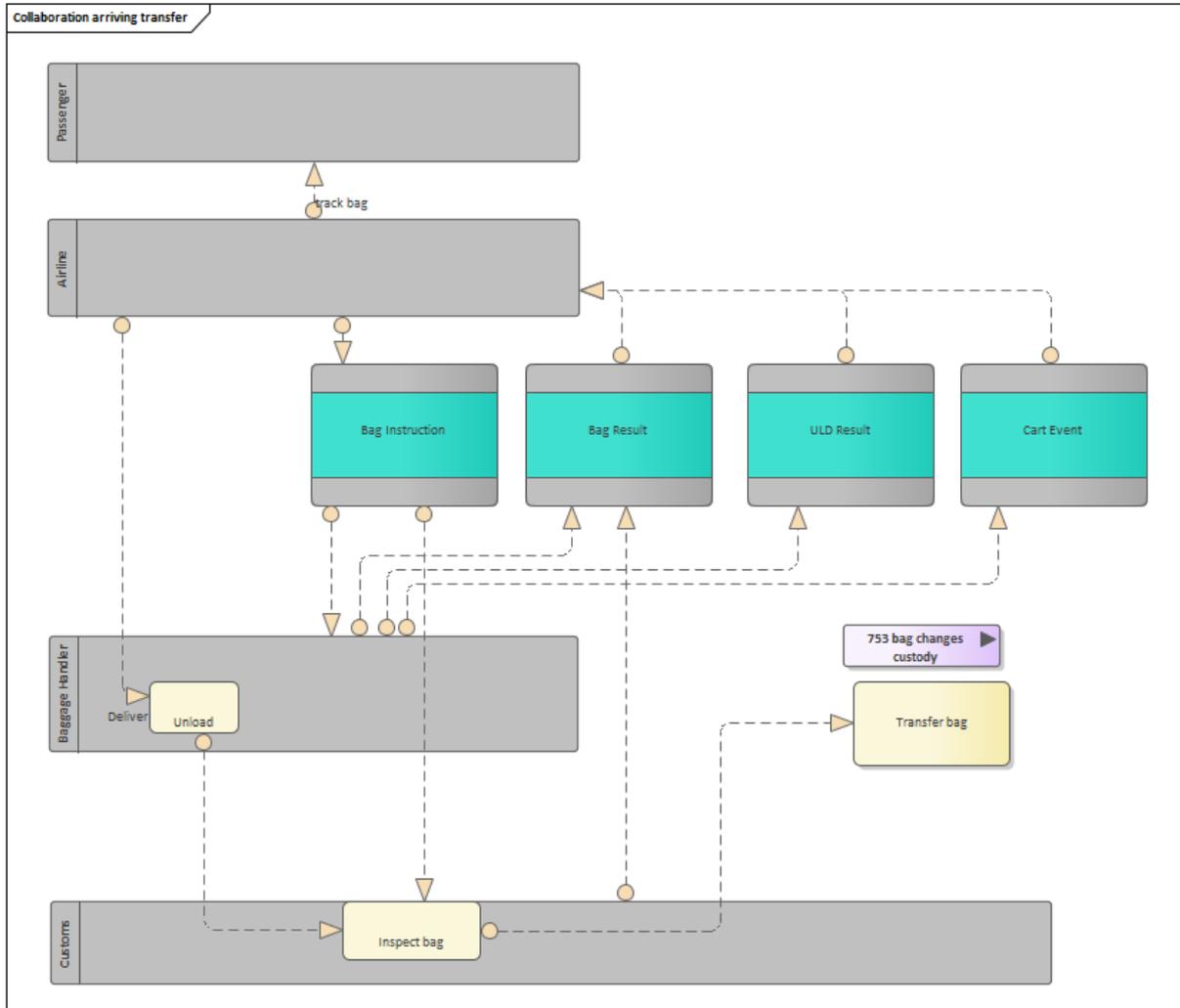
Handle Originating Departing Bag	
Use Case Description	A bag is acquired from a Passenger, subject to baggage handling policies and regulations, screened according to regulatory requirements, sorted into appropriate batch(es) and loaded onto an outbound aircraft.
Actors (Goal)	A departing bag is securely loaded onto an outbound aircraft.
Performance Goals	A departing bag is securely loaded onto the assigned aircraft within an agreed target time duration and reconciled with the Baggage manifest.
Pre-conditions	Passenger arrives at Check-In or Bag Drop.
Post conditions	The departing bag has been loaded onto the assigned aircraft and reconciled with the Baggage manifest.

Handle Departing Cart	
Use Case Description	A cart is acquired from pool and assigned a segregation as per destination requirements, packed with bags of that segregation, moved to aircraft stand and contents are merged onto an outbound aircraft.
Actors (Goal)	A cart securely moves bags from terminal to outbound aircraft.
Performance Goals	A cart delivers its bags within an agreed target time duration and may be reconciled with its planning.
Pre-conditions	Cart is available in make-up area
Post conditions	Cart contents are securely delivered to assigned aircraft

Handle Originating Departing ULD	
Use Case Description	A ULD is acquired from pool and assigned a segregation as per destination requirements, packed with bags of that segregation, moved to aircraft stand and is loaded onto an outbound aircraft.
Actors (Goal)	A ULD securely moves bags from terminal onto outbound aircraft.
Performance Goals	A departing ULD is securely loaded onto the assigned aircraft within an agreed target time duration and reconciled with the Baggage manifest.
Pre-conditions	ULD is available in make-up area
Post conditions	The departing ULD has been loaded onto the assigned aircraft and reconciled with the Baggage manifest.

4.3.2 Arriving Transfer

The Arriving Transfer use case comprises of two primary actors, the Airline and the Customs Authority. The Airline delegates physical rendering to handling parties



Handle Arriving Transfer Bag

Use Case Description	A bag is offloaded from an arriving aircraft and delivered to interline partner airline
Actors (Goal)	A transferring bag is securely delivered to next custodian airline
Performance Goals	A transferring bag is securely delivered to next custodian airline within an agreed target time duration
Pre conditions	Aircraft arrives at stand.
Post conditions	The transferring bag has been delivered to next custodian airline.

Handle Arriving Cart

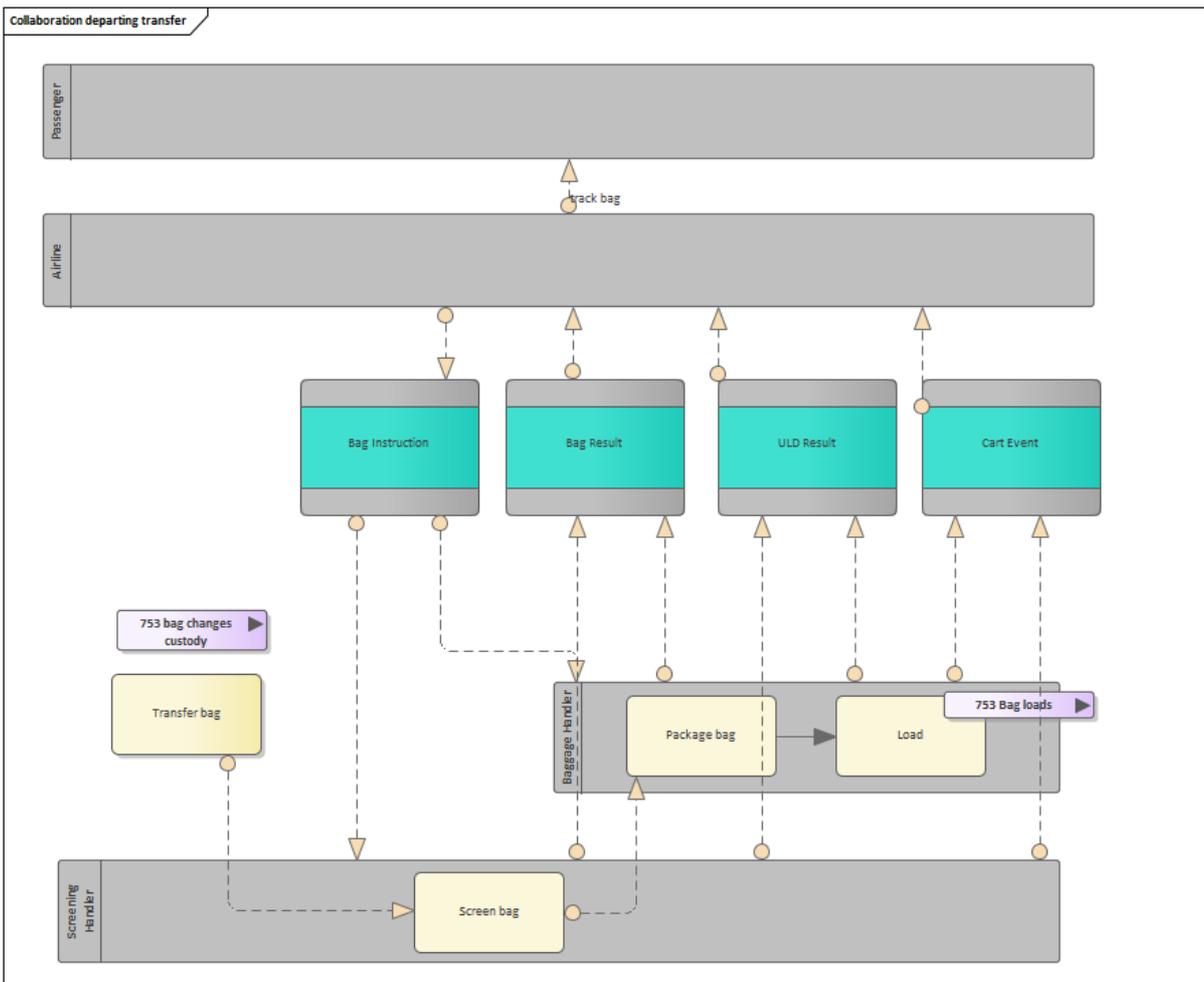
Use Case Description	A cart is acquired from pool and assigned a segregation as per local requirements, packed with unloaded bags of that segregation, moved to terminal and contents are merged onto terminal infrastructure.
Actors (Goal)	A cart securely moves bags from inbound aircraft to terminal.
Performance Goals	A cart delivers its bags within an agreed target time duration and may be reconciled with its planning.

Handle Arriving Cart	
Pre-conditions	Cart is available at aircraft stand
Post conditions	Cart contents are securely delivered to terminal according to segregation

Handle Arriving Transfer ULD	
Use Case Description	A ULD is offloaded from an arriving aircraft and delivered to interline partner airline
Actors (Goal)	A transferring ULD is securely delivered to next custodian airline
Performance Goals	A transferring ULD is securely delivered to next custodian airline within an agreed target time duration
Pre-conditions	Aircraft arrives at stand.
Post conditions	The transferring ULD has been delivered to next custodian airline.

4.3.3 Departing Transfer

The Departing Transfers use case comprises of a single primary actor, the Airline. The Airline delegates physical rendering to handling parties



Handle Departing Transfer Bag	
Use Case Description	A bag is acquired into custody from interline partner and loaded onto an outbound aircraft.



Handle Departing Transfer Bag	
Actors (Goal)	A departing transfer bag is securely loaded onto the outbound aircraft.
Performance Goals	A departing transfer bag is securely loaded onto the assigned aircraft within an agreed target time duration and reconciled with the Baggage manifest.
Pre conditions	Bag is delivered by inbound carrier.
Post conditions	The transferring bag has been loaded onto the assigned aircraft and reconciled with the Baggage manifest.

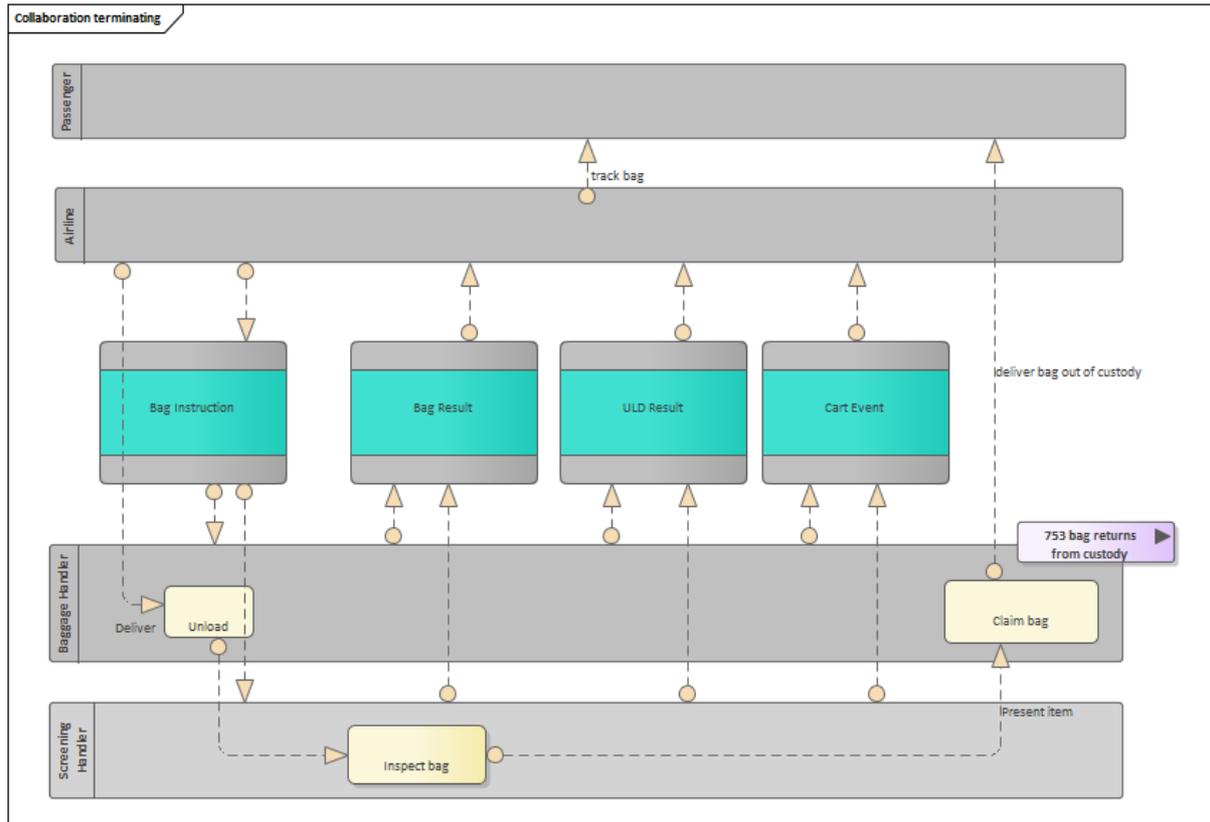
Handle Departing Cart	See under Originating Departure
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Handle Departing Transfer ULD	
Use Case Description	A ULD is acquired into custody from interline partner and loaded onto an outbound aircraft.
Actors (Goal)	A departing transfer ULD is securely loaded onto the outbound aircraft.
Performance Goals	A departing transfer ULD is securely loaded onto the assigned aircraft within an agreed target time duration and reconciled with the Baggage manifest.
Pre-conditions	ULD is delivered by inbound carrier.
Post conditions	The transferring ULD has been loaded onto the assigned aircraft and reconciled with the Baggage manifest.

4.3.4 Terminating Arrival

The Terminating use case comprises of four (4) primary actors who in this instance are the Airport Operator, Airline Operator, Regulatory Authority and the Passenger.

At terminating bag is a bag arriving at the final point in the journey, when it is delivered back to the Passenger. This typically occurs at the Baggage Reclaim carousel at the destination Airport, but increasingly occurs at other locations as required by the Passenger, such as a hotel.



Handle Terminating Bag	
Use Case Description	An Airline operator or its agent offloads a terminating bag from an arriving aircraft and delivers it securely back to the Passenger or Crew
Actors (Goal)	A terminating bag is securely returned to the Passenger or Crew
Performance Goals	A terminating bag is securely delivered to the assigned reclaim area (which may be off-Airport) within an agreed target time duration
Pre-conditions	Aircraft arrives at stand
Post conditions	The terminating bag has been reclaimed by the Passenger and custody is terminated

Handle Arriving Cart	See under Arriving Transfer
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Handle Terminating ULD	
Use Case Description	An Airline operator or its agent offloads a terminating ULD from an arriving aircraft and delivers it securely to terminal infra structure. From here individual bags are moved as required
Actors (Goal)	A terminating ULD is securely delivered into terminal infrastructure
Performance Goals	A terminating ULD is securely delivered to the assigned injection point within an agreed target time duration
Pre-conditions	Aircraft arrives at stand
Post conditions	The terminating ULD has been merged into terminal infrastructure

4.4 Baggage Tasks at tier three

4.4.1 Tasks



Following best practices in logistics, we decompose logistics activity in tasks(atomic actions¹). Any logistics activity can be described as a sequence of these tasks.

Most tasks can be performed on a baggage item, i.e. on a bag, or a baggage cart, or a baggage ULD.

Tasks serve to provide really fine grained process identification.

Tasks are grouped for easy recognition in three types of logistics activities (movement, packaging, loading) and a single type of conformance activities (security)

Task	Description
Movement	grouping of activities to perform the physical movement of baggage items
<i>Acquire</i>	Obtains or receives a baggage item for the purpose of movement
<i>Receipt</i>	Issue a receipt in exchange for taking a bag in custody (special case of acquire from owner)
<i>Claim</i>	Claim a bag (may be justified with a receipt) out of custody (special case of acquire by owner -passenger or crew member-)
<i>Deliver</i>	Delivers a baggage item
<i>Route</i>	Sends or directs a baggage item along a specified course to its delivery location (Ground Transportation per RP1745-A5)
<i>Track</i>	Report that a baggage item is seen at particular place and time without need to launch a particular task
Package	grouping of activities to sort or segregate and make segregation persistent
<i>Put Away</i>	Places a (early) baggage item in a particular storage position or cold area
<i>Withdraw</i>	Retrieves a baggage item from a particular storage position
<i>Pack</i>	Pack a bag into a cart or ULD
<i>Build</i>	Receive bags into a cart or ULD
<i>Unpack</i>	Take a bag from a cart or ULD
Load	grouping of activities to load or unload into aircraft hold
<i>Load</i>	Move a bag or ULD into loading area of (a transport vehicle, ship, aircraft, , etc.) Example: load a bag into designated aircraft hold compartment (Load per RP1745-A5)
<i>Unload</i>	Take-out a bag or ULD from loading area of (transport vehicle, ship, aircraft, , etc.) Example: unloading a bag from an aircraft hold (Unload per RP1745-A5)
<i>Merge</i>	Loads contents of a baggage cart into aircraft or other cart/ULD without notice of individual bags (Merge per RP1745-A5)
Security	grouping of activities to protect against threats; make safe
<i>Open</i>	Opening a baggage cart or ULD so bags can be added or removed
<i>Close</i>	Closing access into a baggage cart ULD so bag content is secured
<i>Seal</i>	Sealing a ULD so bag content is tamper-proof for unauthorized access
<i>Verify</i>	Makes sure or demonstrates that a baggage item meets a certain condition Example: bag does not exceed maximum dimensions for automated sorter, ULD seal is unbroken
<i>Screen</i>	Screens a baggage item for Aviation Security risks (Screen per RP1745-A5)
<i>Inspect</i>	Inspects a bag for Customs concerns
<i>Reconcile</i>	Makes or shows a baggage item actual location/position is consistent with planned location/position Example: a loaded bag has positive authorization to load
<i>Remove</i>	Take a baggage item away from the logistics process Example: A bag in hold fails to reconcile and is removed (offloaded) from regular process Customs claims a ULD for inspection, handler removes the ULD from regular process and rejects to Customs

- ¹ Tasks are atomic activities relative to the context. Context of this implementation guide is data exchange between parties. In a different context a “task” may lose its atomic-ness. E.g. to route a bag assumes the handler has recognized the bag, inspected the plan for the bag and decided on required activity (route). But these are steps from the perspective of internal handler processes. Not steps that can be separately advised to an airline. In case there is no immediate action, the observation can be shared as a tracking of the bag (to track a bag)

Task	Description
	(Offload per RP1745-A5)

4.4.2 Logistics Functions

Movement	grouping of activities to perform the physical movement of baggage items
<i>Acquire</i>	Obtains or receives a baggage item for the purpose of movement
<i>Receipt</i>	Issue a receipt in exchange for taking a bag in custody (special case of acquire from owner)
<i>Claim</i>	Claim a bag (may be justified with a receipt) out of custody (special case of acquire by owner -passenger or crew member-)
<i>Deliver</i>	Delivers a baggage item
<i>Route</i>	Sends or directs a baggage item along a specified course to its delivery location (Ground Transportation per RP1745-A5)
<i>Track</i>	Report that a baggage item is seen at particular place and time without need to launch a particular task

Movement is about acquiring, routing, tracking and delivering a baggage item

Acquire, Receipt, Claim

Acquisition is the function of obtaining a baggage item from another party or facility. Bag Acquisition typically occurs at interface points, for example

- Courier picks up bag from Passenger home
- Party accepts baggage item at Transfer input facility
- Party accepts baggage item at Arrival docks
- Party accepts bag at Out of Gauge (non-conveyable items) desk

For example, when a Passenger drops the bag at a bag drop facility in the Airport, the Airline acquires the bag from the Passenger, and the Airport acquires the bag from the Airline once the bag is injected into the baggage system. When a courier picks up a bag from a Passenger at their home or hotel, the courier is said to acquire the bag from the Passenger.

Acquire always indicates a change of control over the baggage item (control shifts to the acquiring party).

A special case of acquire is change of custody as defined in IATA Resolution 753. Acquisition from and delivery to the bag owner is a custody change, as well as a delivery/acquisition between two interlining airlines in the bag journey. Acquisition for owner may include the issue or activation of a receipt. Acquisition by owner may require the presentation of such a receipt (a Claim)

Delivery

Delivery is the physical function of delivering a baggage item to a party or a facility by another party or facility. For example, a baggage ULD is delivered to Ramp from Make-Up area. In a home pickup, a courier will typically deliver the bag to a collection point, from which the bag will be directed to a flight. In the BHS, the bag is typically delivered to a sorter output point:

- Transfer output point
- Out of Gauge (non conveyable item) output point
- Make-up output point
- Designated courier collection point

Route

Routing is the function of routing a baggage item along a specified course (typically within an Airport Baggage Handling System, or over the Platform, but increasingly via other routes). Baggage items may be routed 'tail to tail' at an Airport, or by trucking for home-collect/hotel-delivery over a shorter distance flight.

The Logistics and Conformance system will select (calculate) the optimum route for a baggage item based on the details held for the baggage item (Flight numbers, Destination, Class of travel) and utilization of baggage infrastructure.

This routing behavior may be repeated at each decision point (i.e. whenever the baggage item has a choice of direction to take). If there is a modification to the baggage item details or in the availability of the resources assigned to it, the route would be recalculated to take into account the new details.

Track

Tracking is function to record the physical location of a baggage item and its tracking state. Baggage Tracking events can be observed as often as the handling party requires. Parties responsible for the handling of the baggage can specify as many tracking points as they require, based on cost effectiveness. A high number of tracking events provides more observations of the baggage and gives better visibility of the route of the baggage.



A message may be produced whenever a Baggage Tracking event occurs e.g.:

- Whenever a tracking observation is made by a Party or system
- Every time the item enters a Process Area
- Every time the item has been observed making a full circuit around a sorter
- Every time the tracking status is changed (mis-tracked/tracked)

The Track function should be used for “generic track events” and not for specific cases for which other types of functions exist, such as delivery, reclaim etc.

Package	grouping of activities to sort or segregate and make segregation persistent
<i>Put Away</i>	Places a (early) baggage item in a particular storage or cold area
<i>Withdraw</i>	Retrieves a baggage item from a particular storage
<i>Pack</i>	Pack a bag into a cart or ULD
<i>Build</i>	Receive bags into a cart or ULD
<i>Unpack</i>	Take a bag from a cart or ULD

Baggage handling parties, whether an Airport or a third party provider of Baggage logistics services, will have baggage storage capabilities. These may be fully automated baggage storage facilities, or simply a secure storage room. These satisfy a number of requirements:

- They can be used to store Early Bags (Transfers and Departures)
- They can be used to store problem type bags (e.g. bags that have missed their flight, are not yet Authorised to Load, etc.)
- They can be used to reduce peak demand for chutes and automated load cells
- They can be used to allow a just in time delivery philosophy to optimise valuable resource usage such as chutes or robotic handling facilities

There are a number of basic functions that apply to the storage of bags as described below.

PutAway

The PutAway Function is typically executed when a bag enters an input point of a bag store, or a baggage cart/ULD is diverted to cold area.

Withdraw

A Bag Withdraw function is typically executed when a bag exits a bag store (a counterpart of Bag Receipt function).

Pack

Pack is a function of packing a bag into a baggage cart or ULD to persist segregation of bags and prepare for movement to aircraft.

Segregation prepares for efficient handling at destination. Criteria include final destination in case of multiple leg flights, transfer bags at destination, bags with an exception code, terminating, cold, hot and tail to tail bags.

Build

Pack is a function of building up a baggage cart or ULD to persist segregation of bags and prepare for movement to aircraft or injection

Unpack

Unpack is a function of unpacking a bag from a baggage cart or ULD.

Load	grouping of activities to load or unload into aircraft hold
<i>Load</i>	Move a bag or ULD into loading area of (a transport vehicle, ship, aircraft, , etc.) Example: load a bag into designated aircraft hold compartment (Load per RP1745-A5)
<i>Unload</i>	Take-out a bag or ULD from loading area of (transport vehicle, ship, aircraft, , etc.) Example: unloading a bag from an aircraft hold (Unload per RP1745-A5)
<i>Merge</i>	Loads contents of a baggage cart into aircraft or other cart/ULD without notice of individual bags (Merge per RP1745-A5)

Load

Loading is the function of physically placing a bag or UL into an aircraft hold (loose or containerized load)

Unload

Unload is the function of unloading a bag or ULD from aircraft hold.

Merge

Unload is the function of transferring all bags from a cart into aircraft hold or different cart/ULD.

4.4.3 Conformance Functions and Event Messages

Security	grouping of activities to protect against threats; make safe
Open	Opening a baggage cart or ULD so bags can be added or removed
Close	Closing access into a baggage cart ULD so bag content is secured
Seal	Sealing a ULD so bag content is tamper-proof for unauthorized access
Verify	Makes sure or demonstrates that a baggage item meets a certain condition Example: bag does not exceed maximum dimensions for automated sorter, ULD seal is unbroken
Screen	Screens a baggage item for Aviation Security risks (Screen per RP1745-A5)
Inspect	Inspects a bag for Customs concerns
Reconcile	Makes or shows a baggage item actual location/position is consistent with planned location/position Example: a loaded bag has positive authorization to load
Remove	Take a baggage item away from the logistics process Example: A bag in hold fails to reconcile and is removed (offloaded) from regular process Customs claims a ULD for inspection, handler removes the ULD from regular process and rejects to Customs (Offload per RP1745-A5)

Open

Opening is the function that makes a cart or ULD available for packaging, typically in the make-up or build area or aircraft parking position.

Close

Closing is the function that ends availability of a cart or ULD for packaging, typically in the make-up or build area or aircraft parking position.

Seal

Sealing is the function that secures content of ULD to unauthorized tampering.

Verify

Verification is the function that checks the baggage item against relevant policies e.g. to ensure that the weight and physical dimensions are within the constraints specified by the Baggage Handler (such as Airline, Airport, Courier). The function records that the weight and physical dimensions (e.g. length, width and height) of the baggage item have been checked against the baggage input statement. The content could be passed between organisations to exchange features of the baggage item that can be used to identify it, such as weight, size, colour.

Screen

The Screening function records the outcome of a screening decision for a baggage item. The BHS typically consists of a Hold Baggage Screening (HBS) system which is capable of sending the HBS results to the BHS. This information can be used by the BHS for information purposes or as part of its Bag qualification process.

Inspect

Customs Inspection is acknowledged as step in baggage journey, but outside mandate of airline to perform. The Inspect function is place holder for possible future development

Reconcile

Reconciliation is the function that reconciles a baggage item actual location/position against plan and authorizations. This information is required and held as part of regulatory processes.

Remove

Removal is the function that takes a baggage item away or off from the position occupied. As an example, this could be the role assigned to a Baggage Handler for performing the task of removing a bag as a result of it being non-reconcilable with a Passenger inventory (e.g. at Aircraft Stand when a Passenger fails to board the flight.)



A Removal event is an exceptional event (as opposed to Unload), in response to a request from Airline to have the bag removed from the process.

4.4.4 Messages

Three gestures are distinguished in baggage messaging as reflection of communication patterns between parties

The airline in custody of bag (and by extension cart and uld)

- *Provides* instructions to initiate and refine agreed baggage processes for a specific baggage item
- *Receives* results on baggage processing from its handlers
- *Notifies* interline/intermodal partners and authorities

Instructions are typically provided when a bag is registered with the airline (i.e. when owner indicates she would like to have a bag transported), and may be refined as a flight is prepared for departure (e.g. to authorize a bag for loading as passenger has boarded). Instructions typically refer to coarse grained process, only use tier one identification

Results are typically produced at completion of a fine grained baggage process (e.g. a bag is packed into a ULD during the Package step, three tiered identification of process) and provide baggage tracking points to the airline

Notifications report on bag process progress in perspective of the custodian airline and are used in peer to peer communication (e.g. in interline journey context, or in notification to owner or authorities)

Baggage messaging recognizes nine message types from combination of the baggage items (bag, cart, uld) with the gestures (instructions -RQ-, results -RS-, notifications -NotifRQ-).

5 Solution Perspective

Who is this guidance for?

This guideline is for any party responsible for the deployment of a baggage information exchange solution. Specifically, these may be:

- IT Architects Developers. Individuals who need to design build and test a solution.
- IT Service Providers. Individuals who need to service manage a solution.
- IT Service Owners. Individuals who need to manage an IT service provider.
-

What does this guideline provide guidance on?

This guidance provides conventions for the configuration of protocols so on a worldwide basis airlines and partners in exchange of baggage information understand how to setup communication for the services defined by the BIX Working Group.

When should this guideline be applied?

This guidance should be reviewed at the design, implementation and service provision stages of an airline broker node.

5.1 Concepts for solution

In Baggage Logistics we recognize exchange of messages between Airline and its Handlers, between peering Airlines, and from Airline to Authorities.

Conceptually Baggage aligns with Modern Airline Retailing:

“The main principle is to split the source of content and the consumption of this content. The source sits in the airline eco-system, and the consumption is done by interfaces and/ or devices accessing these different airline systems, then triggering any update back to the airline systems”².

The source, the single source of truth for a bag (or baggage containing cart or ULD) is with the custodian Airline.

Message exchange is always from or towards the custodian Airline.

From the source there is an outbound connection (typically for instructions and notifications), and there is an inbound connection (typically for reports).

It is up to the custodian Airline to decide how reports reflect in updates to the source of truth.

Connections are established on request of the party that consumes baggage information and may post its findings.

The communication paradigm could be described as “connect directly to the source of the information”.

5.2 Solution Architecture

The architecture describes logical components, interfaces and communication concepts for the RP1755 standard. Regarding the already existing baggage system architecture and implementation rules at an airline or airport, the following mentioned terms or components will not be implemented in a specific environment, but functional implemented in other components.

The solution contains two parts, an information provider (single source of truth) and an information consumer (client to consume information and post findings).

The information provider -custodian Airline- exposes end points (a broker or an API gateway) where the information consumer can subscribe or publish (get or post) information on relevant baggage items

The protocol between end points and client acknowledges delivery of content, either through acknowledgement at level of protocol, or through a synchronous mechanism.

In case of asynchronous protocol, the protocol shall enforce delivery of content in correct sequence. In case of a synchronous protocol, a solution shall be available to prevent excessive polling.

Messages in transport shall be encrypted.

² See [Delivering with orders](https://www.iata.org/en/programs/airline-distribution/retailing/consortium/#tab-2) report at <https://www.iata.org/en/programs/airline-distribution/retailing/consortium/#tab-2>

As an option, messages in transport may be signed to be tamper-proof.

For asynchronous messaging the broker and client shall exchange through a channel as per [AsyncAPI terminology](#). At time of writing the community lacks experience to express guidance on channel naming conventions other than

- Keep inbound and outbound channel between custodian and client distinct
- Keep channels distinct between two clients to respect confidentiality
- Consider to partition message exchange in distinct channels per airport

5.2.1 Architecture Components for asynchronous exchange scenario

The logical components are identified with help of AsyncAPI terminology

Baggage Producer and Consumer

The [producer](#) and the [consumer](#) interface to baggage systems of Airline and Handlers and provide capability to connect to the server.

Baggage Broker

The [server](#) exposes the end points where the conversation is channeled. This is where the “single source of truth” manifests itself. The server is controlled by the custodian Airline. In asynchronous communication the server is typically referred to as the broker.

Baggage System

The baggage system means the already existing baggage system at airlines or handlers where the baggage logic (including the RP1745 baggage communication) is implemented and baggage information is persisted.

These baggage systems must be extended to be able to deal with the RP1755 messages and mechanisms. As the airlines and handlers has different systems running, details on how to implement RP1755 are not covered by this document.

The solution perspective only shows how to communicate from an existing baggage system with the partners for RP1755 messages.

Note that a Baggage System can be either producer or consumer depending on the Role and Gesture in conversation

The airline baggage messaging node shall contain both a broker, a publishing message client and a consuming message client, all three front-ending the baggage system of the airline.

The handler baggage messaging node contains only a consuming and a publishing message client.

Via the baggage messaging nodes, the airline/airline and airline/handler communication for RP1755 messages is established.

Logical components of the baggage broker node are the Broker, the Baggage Message Consumer and the Baggage Message Producer.

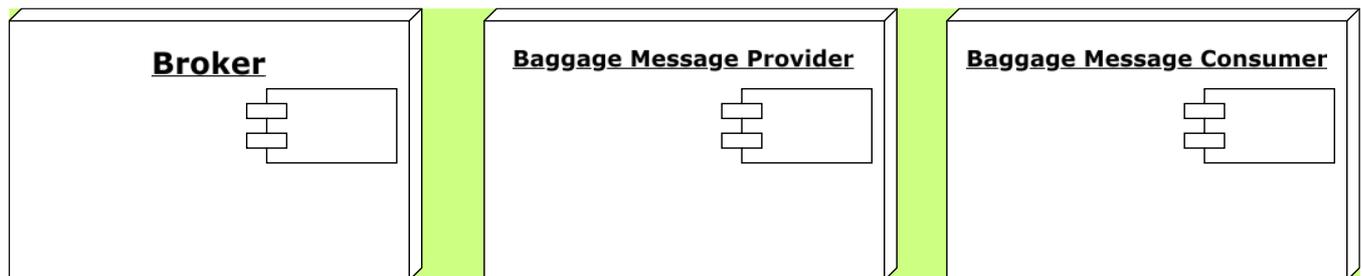
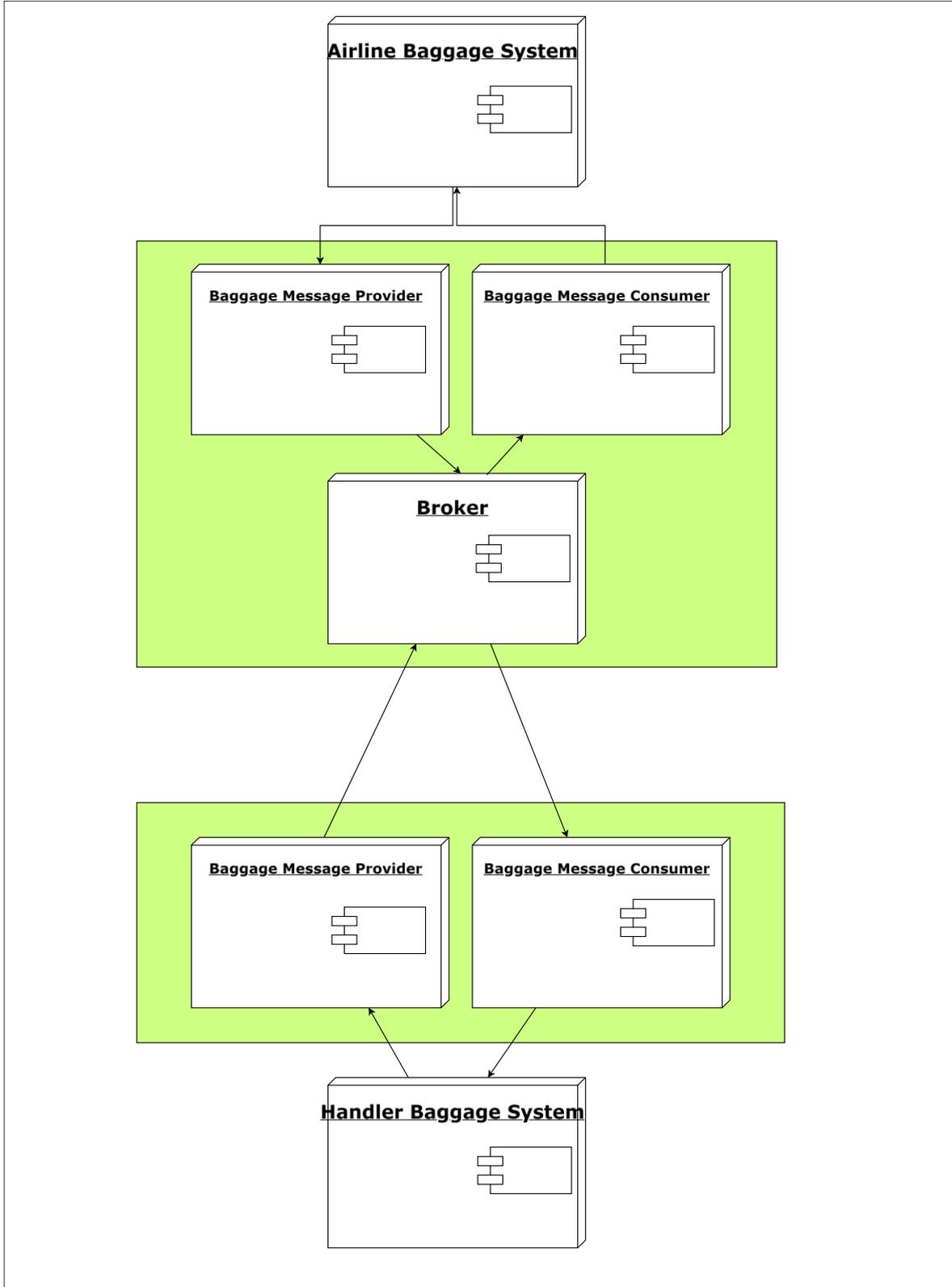


Figure 18 – Logical Components of Baggage Broker Node

Component	Description
Broker	The Broker is a implementation for message queuing. Its task is to channel RP1755 messages between custodian airline and its partners. There are several implementations of the messaging protocols from different vendors available. As the RP1755 communication is based on the standard concepts and functionality of the messaging protocol, every standard implementation of a Broker is feasible.
Baggage Message Consumer	The Baggage Message Consumer is the component which connects to the Baggage Broker Nodes of airlines and registers to their Broker for getting the RP1755 messages.
Baggage Message Producer	The Baggage Message Producer is the component which connects to the Baggage Broker Nodes of airlines and registers to their Broker for publishing RP1755 messages.

Architecture



5.2.2 Architecture Components for synchronous exchange scenario

Placeholder for future work

5.3 Implementation practices

5.3.1 End point discovery

The **custodian airline** exposes **endpoints** for **channel communication** with handlers and partners.

- Airlines may **expose endpoints through their API platforms** (e.g., developer.airline.com) and/or via IATA API Hub (<https://api.developer.iata.org/hub/>).
- **IATA Baggage Community System (BCS) is a Directory Service** is a potential mechanism for endpoint discovery for partner airlines who have subscribed to these services, but its exact implementation is expected to be live in the near future.

5.3.2 Cyber security

5.3.2.1 Access control

- A **flexible access control mechanism** should be adopted, but **no single industry-standard approach** is prescribed at the time of writing.
- Implementers may refer to:
 - Each partner (airline, airport, or ground handler) must authenticate before exchanging baggage messages. IATA Verifier Implementation Guide from the Identity Management Working Group for authentication and authorization models.
 - **Leveraging the future IATA Baggage Community System (BCS)** To exchange baggage message securely, each partner is authenticated after having an account in BCS, and then each partner (airline, airport or ground handling agent - GHA) create a profile in BCS portal. The participant can then request profile connection and if accepted, the participant can view assigned message exchange channels and view message conversion configuration setup by the channel.

5.3.2.2 Transport encryption

- **Implementers should assume that TLS-based encryption will be required for securing MBM XML (RP1755) messages. Transport Layer Security (TLS) 1.2+** is recommended as a minimum standard for securing message transport.
- Implementers should **regularly review** IATA and ICAO cybersecurity recommendations for any updates on encryption best practices.
- **Leveraging the future IATA Baggage Community System (BCS)** will support latest supported encryption protocol (TLS 1.3), and backward compatible with any supported version of this protocol (following IETF recommendations).

5.3.2.3 Message Signing

- Baggage message schemas implement **XML Signature (XMLDSig)** based on [W3C standards](#). Implementers should consider **public key-based mechanisms** for message integrity, aligned with future **IATA security standards**. Implementers are advised to consider **IATA Digital Identity frameworks** for signature verification and **public key management**.

5.3.3 Communication Protocol Guidelines

Overview

In computing, a communication protocol refers to the set of rules that computers use to communicate with each other. The protocol defines the signals that the computers will give each other, and other details such as how communication begins and/or ends, reliability, security and other non-functional communication requirements.

The following table lists messaging protocols that are often leveraged



Protocol	Latest Version	Reference Implementation	Cloud Services	Self-Hosting Vendors	Standards
AMQP	1.0	Apache Qpid	- Azure Service Bus - AWS MQ - RabbitMQ on Google Cloud	- RabbitMQ - Apache ActiveMQ	ISO/IEC 19464:2014
Kafka	3.x	ApacheKafka	- Confluent Cloud - AWS Managed Streaming for Apache Kafka (MSK) - Azure Event Hubs (Kafka API)	- ConfluentKafka - Apache Kafka	No formal ISO/IETF standards (Apache Project)
MQ-IPT	2.1.0	IBM MQInternet Pass-Thru	- IBM Cloud MQ	- IBM MQ on-premises (supports MQ-IPT)	No formal ISO/IETF standards (IBM proprietary protocol for MQ communication over the internet)

Notes:

1. **ISO/IEC Standards:** Only MQTT and AMQP are ratified by ISO/IEC.
2. **Community-Driven Protocols:** Kafka is developed and standardized by its community rather than formal standards organizations.
3. **TLS 1.2+ Support:** All protocols mentioned support secure communication with TLS 1.2 or higher.
4. **Protocol Choice:** The choice depends on use case specifics like low latency (e.g., AMQP) or high throughput (e.g., Kafka).
5. **Cloud Integrations:** Managed services simplify deployment and scale.
6. **Self-Hosting:** Open-source and enterprise-grade options exist for organizations seeking full control.

About MQ-IPT:

- **Purpose:** MQ-IPT is a lightweight gateway that enables IBM MQ traffic to traverse firewalls securely over the internet.
- **Key Features:** Acts as a reverse proxy for MQ messages, supports TLS 1.2+ for encryption, and is ideal for scenarios requiring secure message transmission between remote MQ installations.
- **Standards:** MQ-IPT is proprietary to IBM and not governed by formal ISO/IETF standards.

5.3.3.1 Communication End Point Conventions

This chapter is based on AsyncAPI (<https://www.asyncapi.com/en>) as per IATA OpenAPI Working Group recommendations.

- Airline publishes Async API document to advertise how it makes baggage content available and how it expects to have results being sent back.
- Typical contents
 - Server (uri to the broker + port to the messaging protocol+ path to the service)
 - Channel (queue/topic or similar)
 - Operation (business name + schema reference + send or receive inclination)
- Either as part of AsyncAPI or as complementary OpenAPI document
 - Access endpoint (for authentication and access token)

Construction of channel name/address may follow suggestions on queue and topic conventions as per below

An implementing party can copy/mirror fragments from Airline AsyncAPI document into its own specification to establish communication between Airline and party.

The following guidance provides general conventions for the configuration of internet protocol (IP) for publicly facing end points. It is assumed that a single high availability, load balanced end-point is available per node.

5.3.3.2 End-Point Name Configuration

In managing the baggage exchange we want to distinguish

- Name and version of the service (name, major, minor)
- development life cycle for the service (prod, test, dev)
- channel for exchange between two parties



According to AsyncAPI a fully qualified channel address consists of

- Host and port
- Path
- Local channel address

The **Host** should be identified by a public Domain Name Address. There is no convention for this name.

It is recommended to include life cycle and high level service name in the Domain Name Address

Examples
bag.broker.airline.com
test.somename.airways.com
dev.airline.provider.org

The **Port** derives by convention from chosen messaging protocol.

Examples
:5671 AMQP under TLS e.g. Azure Service Bus
:9092 Kafka under TLS e.g. AWS EventBridge
:8883 MQTT under TLS e.g. Mosquitto

The **Path** distinguishes between services at the host. It is recommended to include service name and major.minor version in the path

Examples
/iata_baggage_/v1.000

The local **channel address** is equivalent to “topic” in publish/subscribe pattern. This is where the custodian airline meets its handler or peer. The custodian is already identified in host. Hence the channel shall identify the handler or peer and it is recommended to further separate between outbound and inbound messages, and to separate between airports. Implementing parties may want to separate up to message type as relevant between two parties

Examples
/airport/handler/instructions
/airport/handler/results
/airport/peer/notifications

5.3.3.3 End-Point Maintenance

AsyncAPI document fragments may be routinely downloaded and updated from source by connecting parties. It is recommended that this occurs on application start-up and a regular basis.

Note
Publishers should support two message versions (current and previous) but subscribers should subscribe to only <u>one</u> . This allows a publisher to easily understand when all subscribers are on the latest release.



6 Glossary

For glossaries of baggage terms we refer to Appendix B of Baggage Reference Manual and [RP1008 as available online](#)



7 Examples

Examples of messages are made available in Baggage Teams channel in the [Examples](#) folder

Examples contain

- A rendering of message in BIX v1(22.1 release)
- A rendering of message in MBM v2 (25.1 release)
- Both BIX and MBM example include RP1745 rendered message and key business context as comments

In addition you find code lists (referenced ones, not those enumerated in xsd) and skeleton for an AsyncAPI document to document the airline interface

Realized examples to date:

- Identify bag to handler
- Delivery from BHS (to Ground Handler)
- Pack bag in ULD
- ULD to stand (MBMv2 only)
- Loose load bag in aircraft
- Position ULD in aircraft (MBMv2 only)
- Bag removed-offloaded