IATA Baggage Off-Airport Operations

Implementation

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Table of Content

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Baggage Off-Airport Operations

Disclaimer

This implementation guide for off-airport baggage operations is not intended to be a set of restrictive instructions. It has been created to provide examples of best practices in the aviation industry and implementation use cases. Some of the recommendations contained in this document may not always be applicable to a specific airport and/or operation type and may need to be adapted and/or customized to the local environment to be applicable. Any local regulatory requirements take precedence over this guide.

The information contained in this guidance has been developed by the IATA Baggage Customs and Security sub-working group. It comprises several subject matter experts from airlines, airports, customs authorities, government security agencies, as well as airport/airline suppliers. They have combined their knowledge and expertise to create a set of best practices within the area of off-airport baggage check-in and "last-mile" delivery.

The sub-group welcomes any feedback or proposals for amending this document, either on ways in which it can be improved or, more importantly, on how the end user has used the information contained within to support a specific implementation plan. Feedback and/or proposed revisions may be sent via email to baggageservices@iata.org.

1. Overview of off-airport operations

The aviation industry is expected to rebound from the COVID19 impact in 2024, surpassing the annual passenger traffic of the pre-COVID period. This growth trajectory is expected to continue its steady growth where the annual traffic in 2024 is anticipated to double in 2042. However, this doesn't necessarily imply that we need to double the capacity of airport infrastructure to accommodate this growth. Instead, the industry should actively collaborate to enhance operational processes and allow some passenger processing tasks to be completed before passengers even arrive at the airport. Baggage operations involves some of the most demanding and time-consuming operational processes which put substantial pressure on airport infrastructure. Meeting customer expectations and customer satisfaction are major components of an airline's success; however, these expectations are continuously evolving with the changing times. Customers are looking for more ways to simplify their travel especially when they choose to check bags and their travel times do not always synchronize with their accommodation or business agenda. In addition, passengers have also shown a significant interest in dealing with baggage ancillary services before arrival at the airport as they seek better comfort and quicker processing times.

Future passenger processing and baggage acceptance will not necessarily need to be completed inside the airport. The industry is already taking initiatives to review operational processes and leverage modern and emerging technologies to move some baggage acceptance and last-mile arrival/delivery tasks outside the airport, closer to the passenger's convenient location. Various airlines, airports, and service providers have already recognized the benefits and are pioneering the implementation of off-airport baggage operations.

The introduction of off-airport baggage handling for departure, transfer, and arrival allows customers more flexible travel plans. Off-airport baggage operations involve the collection and delivery of baggage to and from non-airport locations preferred by the passenger. The use of off-airport collection and delivery can bring significant convenience to the passenger journey by reducing queues at the airport baggage acceptance touchpoint and improving the flow of passengers onto the aircraft. This encourages the use of hold-checked baggage over cabin baggage. However, these benefits do not come without challenges. Current airline and airport infrastructure might need alterations, and there will be a need for some level of standardization and compliance with local authorities' procedures to realize the full benefits of this service.

Looking at off-airport operations from the passenger's perspective, it seems to be a good offer. It will create an opportunity for a seamless travel experience by allowing bags to be collected from home, office, or hotel (HOH) and/or delivered to their preferred location upon arrival at their destination. Nevertheless, there are many logistical and custodial considerations with off-airport processes to fully comply with regulatory requirements set by government agencies.

This implementation guide presents best practices across the industry with the aim of creating some level of standardization for the acceptance, processing, and handling of baggage outside the airport. Additionally, the guide will attempt to clarify the processes and procedures for wider adoption of off-airport baggage operations across the industry.

2. Scope

The scope of an off-airport baggage operation is limited to activities such as baggage check-in and acceptance outside the airport facility upon departure, intermodal transfer, and the delivery of baggage to the passenger's location upon arrival at the destination. For a baggage operation to qualify as off-airport, at least a segment of the baggage journey must involve an off-airport component. An off-airport segment related to the return of a

mishandled bag is out of scope for off-airport baggage operations, as it falls under the irregularity baggage operation process.

The opening time for baggage acceptance prior to the flight will be determined by the airline and the off-airport service provider. However, the cutoff time for baggage induction for both international and domestic flights must adhere to local regulations and operational requirements. The timeline for initiating off-airport baggage acceptance will be established collaboratively by the airline and the service provider, based on the passenger's location and departure route. For instance, a timeline of 24 hours before flight departure can be set for initiating off-airport checked baggage acceptance.

Upon arrival at the destination, the delivery timeline will be mutually agreed upon by the airline and the off-airport handling provider, and for the last-mile delivery, between the off-airport service provider and the passenger.

Issues related to temporary storage and facility requirements for conducting off-airport operations will be managed between the off-airport service provider, the airport, and the airline, according to the requirements set by local authorities, if any.

2.1 Off-Airport Operation at Departures

Off-airport baggage acceptance and remote check-in are increasingly popular services in the travel industry. These services enable passengers to check in their baggage at convenient locations away from the airport, well before their flight departure time. This allows for more efficient planning and processing. Remote check-in can be managed either by the airline or a third-party service provider.

The scope of off-airport baggage check-in includes the acceptance, securing, storing, and transportation of baggage until it reaches the departure airport handover point. Upon acceptance from the passenger, all check-in requirements must be met to ensure the baggage is safe, secure for air transport and in accordance with the baggage allowance policy. Safety and security are paramount to prevent unauthorized interference from the point of baggage collection to handover to the airline.

Staff involved in handling baggage should have the necessary training and skills for baggage acceptance. Similarly, facilities at off-airport locations where baggage acceptance occurs should meet the minimum infrastructure requirements for accepting, storing, and transporting baggage.
The introduction of off-airport baggage acceptance services can enhance the passenger experience and increase airport throughput.

2.2 Off-Airport operations at Transfers

To avoid passenger dissatisfaction and baggage mishandling, the transfer process for passengers and their baggage at transfer points, including intermodal transfers, requires proper coordination. The introduction of off-airport operations can simplify and enhance the passenger experience. The scope of off-airport baggage operations related to transfers includes processing baggage between different modes of transport (e.g., trains, buses, cruises) or between flights departing from different airport locations.

Implementing off-airport baggage handling for transfer enables both airlines and airports to speed up baggage processing, reduce staffing requirements, and alleviate congestion. This approach allows for baggage processing at alternative locations for transfer passengers.

2.3 Off-Airport Operation at Arrivals

The scope of off-airport baggage operations for arriving passengers includes the last-mile delivery of baggage from the airport to the passenger's preferred location. Based on the agreement between the airline and the off-airport service provider, the transfer of custody happens at the airport and delivery is then completed by the off-airport service provider according to the passenger's preference. This approach can significantly improve the throughput of arrival halls and carousel usage at airports facing capacity challenges. Additionally, it allows passengers to avoid long waits for their baggage and exit the airport more quickly. When handling last-mile baggage delivery on arrival, airlines and off-airport service providers must comply with local customs requirements and other regulatory requirements from relevant authorities. Implementing door-to-door (D2D) baggage delivery on arrival is not advisable if there are any requirements, especially from local customs authority do not clearly permit it. The delivery of delayed or mishandled baggage is out of scope of arrival off-airport baggage operations.

3. Benefits

3.1 Airport Benefits

With the rapid growth in passenger traffic, infrastructure such as airport real estate, baggage handling systems, and check-in facilities may not expand at the same pace. However, existing processes can be enhanced, or new ones introduced, to optimize and efficiently use current infrastructure to support traffic growth.

Failure to adapt can place additional pressure on airport facilities, especially in public spaces, with increased demand for check-in desks, kiosks, self-bag drops (SBDs), and queuing areas. This can negatively impact the passenger experience and potentially compromise safety and security. Off-airport baggage operations aim to introduce new processes that create a more efficient baggage handling system by shifting some baggage acceptance and handling activities away from costly airport infrastructure to more manageable, lower-cost locations. This approach allows airports to boost passenger throughput, improve the passenger experience, achieve more predictable operations, handle baggage more efficiently, and enhance overall safety and security.

Off-airport sites offer greater flexibility in terms of facilities, as they can be established at existing locations that meet the necessary conditions. Check-in desks, kiosks, and self-bag drops (SBDs) at these off-airport sites not only help alleviate congestion within the passenger terminal but also reduce the need for such equipment inside the terminal. The freed-up space can be repurposed for retail facilities, lounges, or counters for new airlines, potentially increasing airport revenue.

From a baggage handling perspective, accepting check-in baggage earlier at off-airport locations allows for its timely transport to the airport and controlled entry into the Baggage Handling System (BHS), avoiding pressure on system capacity. This approach helps manage peak loads and enhances the overall handling capacity of the BHS. Additionally, implementing Early Baggage Storage (EBS) at off-airport sites, where costs may be lower, can further optimize operations.

Below are some of the main airport benefits of off-airport baggage operations:

A. **Resource Optimization:** Streamlining airport operations and reducing the need for extensive on-site infrastructure and personnel.

B. **More Flexibility on Storage**: Using off-airport facilities for baggage storage provides greater flexibility and cost savings. Airports benefit from using cheaper real estate for storage off-airport, such as

outsourced off-airport facilities, temporary facilities, self-service storage facilities, or even mobile storage in trucks as they move between off-airport facilities and the airport.

C. **Speedy Processing, Less Queuing**: Expediting the check-in process and reducing passenger queuing time, ultimately increasing airport throughput.

D. **Sustainability**: Supporting operational and environmental sustainability as passengers with only carry-on baggage tend to use shared transportation to come to the airport rather than using private cars or taxis, thereby reducing their environmental footprint.

E. **Reduced Congestion on Land-Side**: More passengers use shared transport to and from the airport, thereby reducing congestion

F. **Enhanced Security**: Reduced queuing at airport check-in and security points, particularly at airports where screening before check-in exists, enhances overall security and allows passengers more time at retail facilities. Passengers with more free time can enjoy airport retail and duty-free shopping, enhancing their travel experience.

3.2 Airline Benefits

Off-airport baggage operations can offer significant benefits to airlines, like those experienced by airports. Managing peak-time baggage traffic is critical to ensuring on-time flight departures, a key performance indicator for airlines. Early baggage acceptance at off-airport locations provides more time for handling and processing, reducing last-minute tasks at the check-in counters and speeding up passenger processing. This service can greatly ease operational pressures during peak times, cutting down the need for additional staff and equipment.

With the expansion of off-airport baggage processing, airlines can increase their service flexibility by providing customized baggage handling options for passengers with unique requirements, such as those heading to sporting events, ski resorts, or vacation spots. Some key benefits of off-airport baggage operations for airlines include:

A. **Removes Extra Pressure from Resources During Peak Times for Departure Operations**: Off-airport operations alleviate operational pressure on airlines during peak departure times. By handling baggage off-site, the volume of bags processed at the airport is significantly reduced, easing the strain on check-in counters and baggage handling systems during busy periods. Reducing the baggage processing burden during peak times helps maintain smooth operations, minimizing delays, and ensuring flights on time departure.

B. **Potential Optimization of Manpower and Infrastructure**: Airlines can better optimize their use of manpower and infrastructure with off-airport baggage services. With fewer baggage-related tasks at the airport, airlines can reallocate staff to other critical areas, enhancing overall efficiency and reducing the need for a large workforce dedicated solely to baggage handling. Less reliance on extensive on-site baggage handling facilities can lead to significant cost savings. Airlines can invest in smaller, more efficient infrastructure or repurpose existing space for other uses.

C. **Better Baggage Disruption Management**: Off-airport baggage services offer a proactive approach to managing passenger baggage during flight disruptions. Disrupted baggage can be delivered directly to passengers' destinations, avoiding the need for passengers to wait at baggage carousels.

D. **Enhance the Passenger Experience**: Off-airport baggage operations can significantly enhance the overall passenger experience. Passengers can drop off their bags at convenient locations before arriving at the airport, bypassing long lines, and reducing the stress associated with traditional check-in processes. If baggage is handled off-site, passengers spend less time on baggage-related procedures, giving them more time to relax, shop, or dine at the airport. Additionally, a streamlined and hassle-free baggage process contributes to a more enjoyable travel experience, which can lead to increased customer satisfaction, loyalty, and positive reviews for the airline.

Another aspect to consider is how off-airport check-in can contribute to cost reduction for both airlines and airports:

i. **Facility Cost**: If the off-airport check-in site is within a location owned by a party other than the airport or the airline, and if that location can benefit from more users attracted by the check-in facility, the cost can be borne by or at least shared with the facility owner (e.g., train stations, shopping centers). For airlines, the rent outside the airport is normally cheaper than within the airport. For the airport, the extra space and optimized facilities within the airport can be turned into other revenue-generating opportunities.

ii. **Equipment Cost:** Off-airport check-in, if expanded, will reduce the need for costly equipment such as common-use equipment at the airport as more baggage is checked in at off-airport locations ahead of time. This ultimately reduces the need to own such equipment. This also applies to manpower costs if any.

3.3 Passenger and other stakeholders' benefits

- Additional source of ancillary revenue (hotel)

- Hotels – early available rooms for other passengers, early capacity availability, part of promotion as additional service

- Transportation Cost: This represents an additional cost since, under the standard airport check-in process, passengers usually bring their baggage directly to the airport. However, if passengers drop off their baggage at an off-airport location beforehand, they can travel light to the airport. This eliminates the need for private transportation often required when carrying checked-in baggage, allowing passengers to opt for shared or public transportation instead.

- Passenger freedom to move freely without necessity to go back to hotel and pick up the bag

4. Use cases

Before deploying an off-airport baggage operation, an airline must address several key factors. This operation involves accepting baggage from passengers at off-airport sites, processing it, and delivering it to the passenger's preferred location upon arrival. Prior to implementing this service, the airline needs to engage with relevant government authorities, such as security and customs. Consultations should occur among the airline, government agencies, and any third parties responsible for handling baggage at off-airport sites, especially if the airline itself isn't performing these tasks. Addressing the concerns of all stakeholders is essential.

Some off-airport activities might also require changes or additions to infrastructure, ranging from simple temporary storage facilities at the airport departure and arrival areas to more complex baggage handling

systems (BHS) at off-airport locations. Therefore, the airport is a critical partner in discussions for the deployment of the service. Additionally, the airline can use this document as a guidance resource to define its own procedures for off-airport baggage operations and establish service level agreements (SLAs) with partners.

While this document covers some common off-airport operasstions, it's not an exhaustive list of use cases. As off-airport baggage operations expand globally, new scenarios may emerge, which will be added to this guidance.

4.1 Off-airport check-in at departure where passenger and baggage are flying on the same flight

This use case involves a typical off-airport check-in and baggage acceptance process. In this scenario, passengers check in and hand over their baggage well ahead of the flight departure time. This allows the airline sufficient time to process the baggage and ensure it is ready for the flight on time. Accepting and processing baggage at off-airport sites before the flight helps minimize instances of missing baggage due to last-minute check-ins. Additionally, it reduces congestion and long queues at the check-in counter for baggage drop-off.

Passengers arrive ready to fly, and this flexibility extends to their trip to the airport. They can choose shared public transportation instead of private vehicles or taxis. To differentiate baggage accepted at off-airport locations from those delivered at the airport's self-bag drop (SBD) or check-in counter by the passenger, the airline may issue inactive bag tags (not yet registered in the BHS) until the passenger arrives in person at the airport and the bag is reconciled. Alternatively, the off airport service provider delivers the bag to the airline on behalf of the passenger, triggering the bag activation at the airport or once accepted from the passenger. Furthermore, appropriate security measures must be in place to protect the bag from unlawful interference during its journey to the airport. A well-defined handover process and verification procedure are necessary when transferring baggage from the delivery truck to the airport facility.

Once the baggage tag is active and reconciliation is completed with the passenger, the normal journey of the baggage continues alongside the passenger. Upon arrival, the baggage is collected by the passenger at the arrival facility, concluding the journey of both the passenger and the baggage
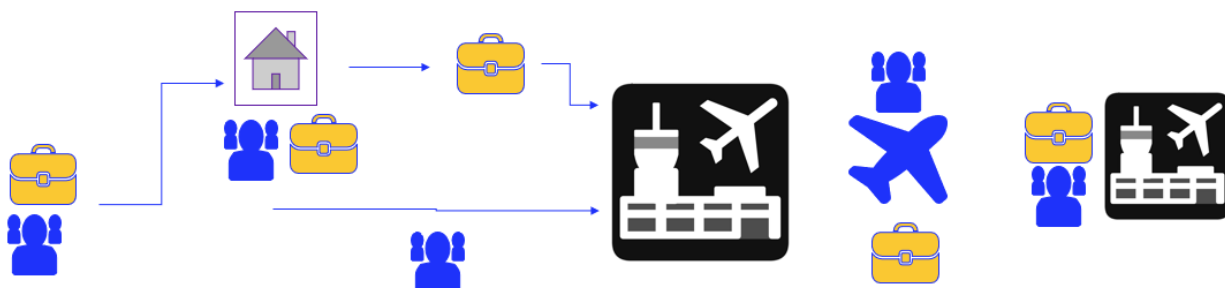
4.2 Off-airport check-in at departure where baggage flies ahead of the passenger on a different flight from the departure airport (Bag Advance)

This use case involves forwarding baggage ahead of the passenger following a baggage acceptance process at an off-airport location. Specifically, baggage is sent on an earlier flight and verified as belonging to passengers with valid itineraries, matching the passenger's destination within the agreed timeline according to

the UNAR process described in IATA recommended practice 1745A. Regulatory authorities at the origin, transfer, and destination may implement additional controls to ensure that the baggage corresponds to the passenger with a confirmed ticket, aligned with the baggage's itinerary.

The standards for accepting such baggage as Unaccompanied Baggage (UNAR), where all travel requirements are met and the baggage travels ahead of the passenger, are outlined in **IATA Recommended Practice 1745a, section 5.4**. Additionally, **ICAO Annex 17, section 4.5.4**, covers the acceptance of unaccompanied baggage on board an aircraft, subject to appropriate screening.

Baggage advance is more common on busy domestic routes with multiple daily departures. In these cases, flights have tight ground turnaround times, and airlines aim to optimize operations by using larger aircraft to avoid leaving behind baggage belonging to passengers scheduled on smaller equipment departing later in the day. Passengers have also expressed interest in this service, as evidenced by the results of the IATA global passenger survey. They appreciate the convenience of having their baggage sent ahead to their destination, provided they are assured of receiving their baggage upon arrival.
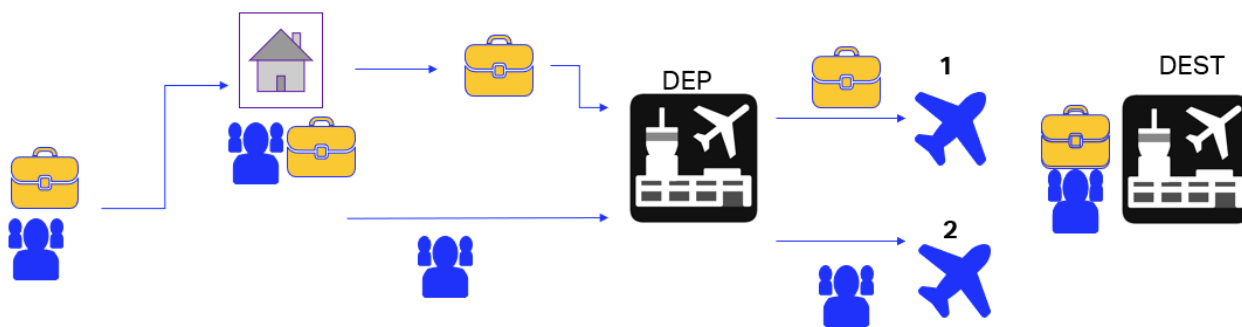

4.3 Off-airport check-in at departure where baggage flies ahead of the passenger on a different flight with transfer

This use case addresses scenarios where advance baggage, as described in Use Case 4.2, involves a transfer point before reaching the final destination. In such cases, it is crucial to consider the regulatory requirements of the country where the transfer station is located regarding baggage advance options. If the regulations at the transfer point do not permit it, the baggage can be forwarded to the destination on the same transfer flight as the passenger. However, approval for advancing the baggage must be obtained from the regulators of the leg before the transfer station. Once both the baggage and the passenger board the same flight at the transfer station, the usual journey of the passenger with their baggage resumes, and both will arrive at the destination together, allowing the passenger to collect the baggage in the arrival hall.
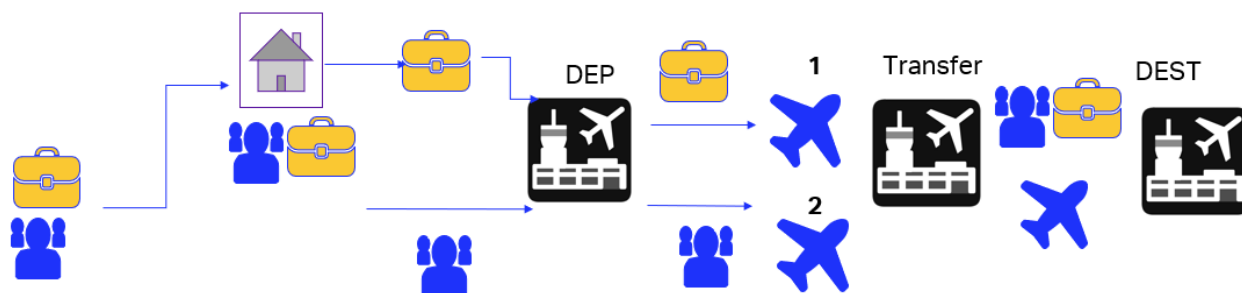
4.4 Pre-clearance of baggage for customs and security procedures upon departure from the origin station

Baggage pre-clearance significantly enhances the passenger experience and streamlines handling processes at transfer points. When baggage is pre-cleared, it bypasses rigorous physical customs or security checks upon arrival. Instead, the pre-clearance procedure allows for the receipt of baggage scan messages, enabling risk profiling and analysis before the flight arrives at a transfer point.

For the successful deployment of this service, regulatory authorities at both the origin and transfer/destination stations play a pivotal role. They collaborate to establish a standard procedure for exchanging information prior to flight arrival. Based on this information, passengers are efficiently handled at the transfer or arrival point. Airlines and regulators might need to agree on security measures to prevent mix-ups between pre-cleared and normal baggage by dedicating a specific facility for pre-cleared baggage.

This use case has been successfully piloted on routes with high passenger traffic, in close cooperation with relevant authorities. The results demonstrate significant improvements in both passenger experience and airline on-time performance. For instance, consider a scenario where a passenger traveling on an international route doesn't need to retrieve their baggage for customs clearance when connecting to a domestic destination without international customs requirements. By receiving the scanned image of the baggage from the origin station, authorities can perform risk profiling, granting a green light for seamless baggage transfer to the BHS system without passenger intervention.
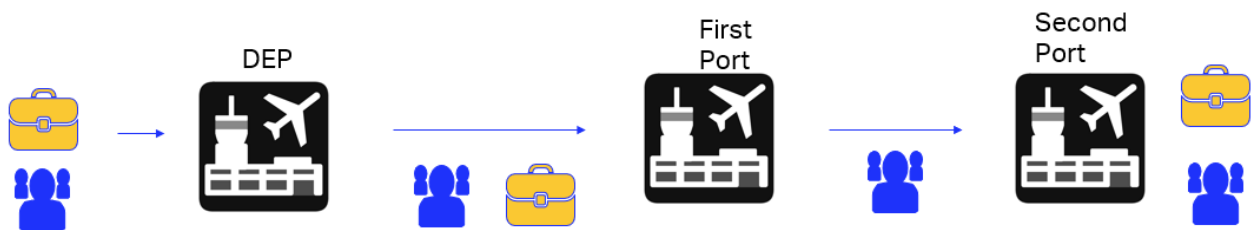

4.5 Baggage and passenger move together intermodally (on different modes of transport)

Baggage operations are continually evolving, with increasing collaboration across different modes of transportation to meet passenger demand and enhance the travel experience. Airlines now partner with other transport providers to create a seamless journey beyond their core offerings. For instance, a passenger's itinerary might include segments by train, cruise ship, or bus—a true multimodal travel experience. However, this integration requires the acceptance and processing of baggage across these various modes of transport.

To achieve successful collaboration, well-defined processes and handling standards must be established. Information sharing among all partners involved in baggage handling is crucial. Additionally, a common standard for license plate number (LPN) issuance and interpretation must be agreed upon, and baggage status updates need to be consistently tracked and communicated across different transport modes for smooth handling.

In this use case, regardless of the mode of transport, passengers and their baggage are accepted, processed, and transferred seamlessly. Security agencies may need to be involved to prevent unlawful interference by defining secure temporary storage areas. In abnormal situations, such as baggage mishandling, the responsible party should proactively communicate with all other parties and implement a process to handle baggage claims at the destination or according to resolution 780.
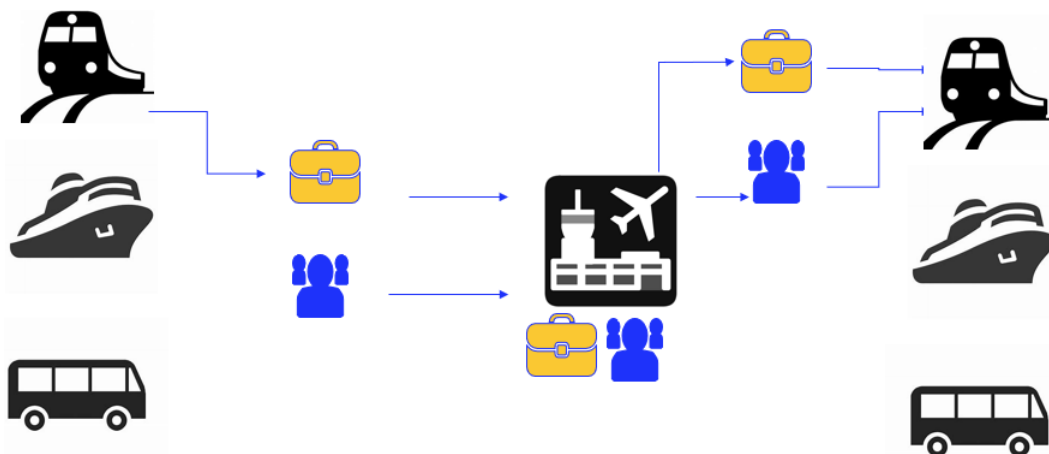
4.6 Off-airport check-in at departure with D2D delivery on arrival

This use case concerns the last-mile delivery of baggage upon arrival, which can include extended door-to-door (D2D) delivery in conjunction with off-airport check-in at departure. In this scenario, a passenger's baggage is accepted at an off-airport location (as described in Use Case 4.1) and subsequently reunites with the passenger at their final destination (such as home, office, or hotel).

The responsibility for delivering the baggage from the destination airport's arrival hall to the passenger's specific location lies with the airline or the off-airport service provider. During this last-mile delivery, the baggage must undergo customs checks. Various approaches can be employed to ensure compliance with customs requirements.

For both the airline and the off-airport operator, consulting with the relevant authorities in their jurisdiction is crucial. Proposing solutions that allow the passenger to avoid direct involvement in customs clearance for last-mile delivery is essential. Passengers who have "nothing to declare" and whose baggage qualifies for the green lane should complete the necessary customs declaration before leaving the airport. This ensures that the party handling the last-mile delivery can perform the service seamlessly.
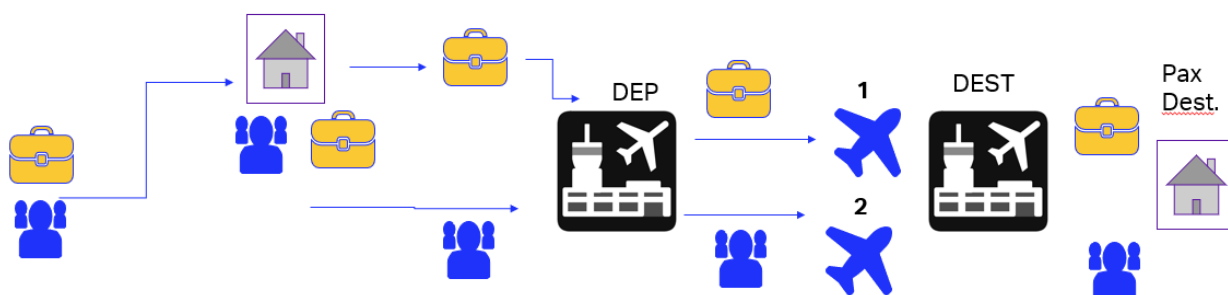
4.7 Baggage and passenger move separately on different modes of transport for the entire, or a portion of, the journey

This use case involves scenarios with multimodal transportation, as described in Use Case 4.5. However, at some point during the journey, the baggage travels on a different mode of transport than the passenger, provided all regulatory requirements are met. A typical example is transporting baggage to the destination airport using a mode other than the passenger's flight—for instance, to a ski resort or golf resort where

oversized baggage cannot fit on the small aircraft operating to that destination. In such cases, the baggage is loaded onto trucks for transportation.

Another example could be a domestic route with a significant volume of baggage operated by a small aircraft. In this situation, the airline may choose to transport the baggage by road. To ensure smooth handling and prevent baggage mishandling, proper coordination and proactive planning are essential.
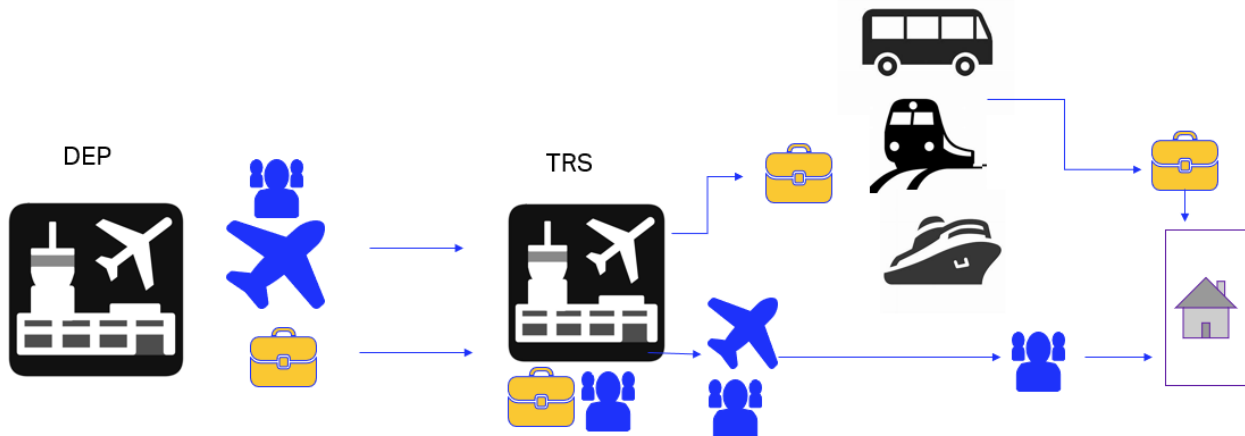
5. Basic Requirements for Service Providers to perform off-airport operations

Acceptance, handling, and processing of baggage by off-airport service provider should be performed according to a mutually agreed-upon contract, with full liability for any mishandling, loss, or pilferage resting upon the responsible party. The agreement should clearly define the scope of the service, passenger obligations, off-airport service provider obligations, required documents and formalities, operational processes, and conditions.

SLAs with airport authorities and other relevant stakeholders regarding off-airport baggage acceptance, screening, and processing, including KPIs and cut-off times for baggage acceptance and delivery, must be established and included in the agreement. To measure the performance of the off-airport service provider, the airline may define Key Performance Indicators (KPIs) as part of the agreement.

The agreement between the off-airport baggage service provider and the airline should adequately address General Data Protection Regulation (GDPR) and data privacy laws. The off-airport service provider should possess the necessary infrastructure, equipment, facilities, and training to effectively serve passengers using the off-airport baggage operation service. This includes selecting suitable locations and having the appropriate baggage screening devices.

In addition to meeting airline requirements, the off-airport service provider may need to demonstrate its conformance to local regulations as well as competency to address any concerns from local regulators.

For efficient communication, the off-airport service provider must have the necessary IT systems in place to process baggage and passenger check-ins, issue baggage tags, send baggage messages (such as BSMs and BPMs), and receive and process these messages. Any such messages shall be time stamped and capable of being delivered in real time. System communication must ensure effective data sharing (e.g. open API) between off-airport service provider and the airline.

The off-airport service provider's actions should trigger the relevant messages required to handle airlines' baggage inventory efficiently and effectively. This means the service provider should be able to integrate with an airline's DCS or create the required BSM messages as described in the relevant Recommended Practices.

Any action resulting in a change of custody, starting from the acceptance of the baggage by the off-airport service provider, should generate Baggage Process Messages (BPMs) as described in the relevant Recommended Practices. It is also important to ensure that all parties participating in the off-airport check-in can share and exchange data, allowing airlines to track baggage in accordance with Resolution 753. At every point where a change of custody occurs, a delivery handshake point between the off-airport service provider and the airline or ground service provider for the ramp must be set as an audit trail in case of mishandling. This will not only ensure that airlines and off-airport service providers can identify where baggage was mishandled but might also enable airlines to automatically perform baggage reflighting or other tasks if required. Any baggage mishandling that occurs prior to handing over the baggage to the airline at the agreed delivery point, or because of a delayed delivery, will fall under the full responsibility of the off-airport service provider and/or GHSP.

Staff involved in off-airport baggage handling should be trained competent to perform their duties. As a minimum, all personnel shall meet training requirements as per Airport Handling Manual (AHM) chapter 1110. Additional security training may be required as per local regulation. Applicable training modules may be found in Appendix 2, Training Requirements for Service Providers

The off-airport service provider should ensure the baggage is suitable for flight and adheres to all required safety, security, and screening requirements.

It is important that a baggage subject matter expert (SME) is involved in the negotiation of service procurement and contracts between the airline, any airport ground service providers (GHSPs), and the off-airport service provider.

6. Regulatory compliance and security measures

Parties involved in off-airport baggage handling must possess the necessary authorizations from the relevant government agencies and authorities. This usually includes governmental license to operate a particular classification of the business and a permit from the airport.

Regulatory authorities may impose strict requirements for providers of off-airport baggage handling to ensure they meet the same security and safety standards as those imposed on other operators at the airport. There can be some additional threats related to the expansion of baggage handling services outside the secured airport vicinity. Therefore, additional requirements may apply based on threat levels and risk assessments conducted by national and local authorities Hence the off-airport service provider should be able to demonstrate its capability to safely and securely handle the baggage processed outside of the airport. Once baggage is accepted from passengers, its temporary storage and transportation to the airport must be protected from unlawful interference.

The off-airport service provider shall comply with the applicable regulatory measures regarding the:

  A. Level of screening compliance
  B. Security screening processes and procedures
  C. Security screening infrastructure and equipment compliance
  D. Screening staff compliance
  E. Restricted and prohibited items regulatory requirement compliance
  F. Monitoring and audit compliance

Whenever D2D baggage delivery upon arrival is involved, the passenger, the airline and off-airport service provider shall make the necessary effort to comply to the destination country's customs requirements. In some States, customs authorities may require only passengers to clear customs upon arrival. In other States,

passengers can submit a pre-arrival customs declaration, facilitating D2D delivery. Upon arrival for a D2D service, if customs authorities hold bags, passengers are expected to present themselves as per local regulations and assist the service provider in clearing the bag for D2D delivery.

Airlines, airports, and off-airport service providers are expected to agree on processes and procedures to allow and verify baggage retrieval authorization by the off-airport service provider.

A strict process must be in place to ensure that the off-airport service provider is authorized to retrieve baggage from the collection location within the security restricted area.

Access control measures should also be implemented to ensure that only authorized entities have access to the designated baggage collection location , which may be in the customs area. Until the off-airport service provider collects the baggage from the designated baggage collection location, the airline should safeguard and ensure that access to baggage belonging to its passengers is limited to authorized entities. However, where the off-airport service provider collects the baggage directly from the baggage carousel, existing security measures would apply.

In addition to security screening and background checks, staff of the off-airport service provider may need to undergo additional vetting processes to fully mitigate any security breaches due to the nature of their work.

7. Implementation options: Handling process and procedures related to identified use cases

7.2.1 Off-airport baggage check in

According to IATA Recommended Practice - **RP 1745, Section 3.2, D element**, it is important to include the location code when conducting remote check-ins during off-airport procedures. Off-airport check-in locations can vary widely and include home check-in (HOME), hotel (HOTAC), office building (OFFC), seaport (PORT), train station (TRST), bus station (BUST), airport self-service drop-off (BAGD), convention center (CONV), car park (CRPK), car rental (CRRT), drive-thru (DRVT), shopping center (SHPC), resort (RSRT), sports event (SPRT), charter services (CHTR), and off-airport service provider offices (OAHO), as outlined in Section 3.1.

For off-airport check-in services, it is crucial for both the airline and the off-airport service provider to ensure their systems are integrated and thoroughly tested to facilitate the acceptance and check-in of baggage from passengers. Compatibility checks are particularly necessary if the service provider's role extends beyond baggage acceptance to include passenger check-in, document verification, or other related tasks. Additionally, all necessary devices, such as tag printers, boarding pass printers, information tags, and name labels, must be readily available.

If a passenger has already checked in and received their boarding pass before the service provider arrives to collect the baggage, a recommended practice is for the service provider to obtain a copy of the boarding pass when collecting the baggage. The service provider can then print the baggage tag at the airport and induct the luggage into the BHS. An electronic baggage tag (EBT) can also be an effective solution, allowing the passenger to activate the tag, making it a "ready-to-fly bag" when collected by the service provider.

Airlines should determine the appropriate stage for activating the baggage tag for off-airport check-in, depending on local procedures and regulations. Airports or off airport service providers may provide temporary facilities to store accepted baggage.

7.2.2 Door-to-door (D2D) Delivery Upon Arrival

Before implementing a D2D delivery service upon arrival, it is advisable to engage with relevant government authorities to understand the regulatory requirements, in particular from the customs authorities, with which

airlines and service providers must comply. Depending on local customs and security regulations, various processes may be followed. In cases where passengers complete customs pre-clearance before arrival, they must coordinate with the off-airport service provider before leaving the airport to ensure there us no need for the passenger to be present for customs inspection. If the passenger's presence is required for customs clearance of baggage for last-mile delivery by the off-airport handler, the passenger must complete the customs clearance and hand over the baggage to the handler.

Adhering to IATA RP 1745, it is considered a good practice to indicate the handover or delivery location in the.J element of the message format. Tracking and information sharing may be required per agreements with the airline, as service providers must comply with Resolution 753. The service provider must obtain authorization from the airline to perform D2D delivery services upon arrival.

7.2 Claim and Fraud prevention mechanisms

Outlining liability policies and procedures for mishandling (all types) and/or proration will be addressed under Resolution 754/ 742? (referred to the Clasims and Prorate working group)

Research on the condition of carriage : which is applicable to air transport only

Airline may make available the list trusted service providers for the traveling community. Airline may notify the passenger about the picking up of the baggage by the service provider from the airlines app or email.

The service provider upon acceptance of baggage from the customer should produce a claim tag (electronic) confirming the acceptance of the bag from the passenger.

Recommended , Photo of the bag is taken upon acceptance and delivery on arrival to confirm it is delivered same way it was received.

Service provider should get the proof of delivery signed by the passenger upon delivery.

Appendix 1: Operational Case studies from Airlines and Airports

Case Study 1: Beijing Capital International Airport (BCIA)Off-Airport Baggage Check-in at the Olympic Village

I. Background

In 2008, Terminal 3 of BCIA officially began operations, and by 2021, the airport had completed the construction of a full-process baggage tracking system. For outbound baggage, data collection is achieved through RFID and barcode scanning technologies at each step, including check-in, security check, sorting, loading onto carts, loading onto aircraft, unloading after landing, and transfer points. In terms of data exchange, BCIA provides a baggage information sharing service that is synchronized in real-time with the Civil Aviation Administration of China's baggage tracking platform. This has created a big data center for baggage, covering the airport, airlines, and upstream and downstream airports, providing better support for the base operations of airlines.

II. Case Analysis: Technology, Processes, and Facilities

Based on the above baggage tracking system within the airport, BCIA has extended its baggage check-in/drop-off and tracking services to the Olympic Village.

(I) Business Process:

Pain Points in Baggage Handling During the Olympics

Baggage handling has always been a critical issue in the Olympic logistics, with several key characteristics. Specifically, it firstly lies in the wide geographic scope and long transport chains. For the Beijing 2022 Winter Olympic Games, the main competition venues were situated in Beijing, Yanqing, and Zhangjiakou. Baggage transportation lines extended several hundred kilometers. Second, there were multiple processes involved. In addition to the standard baggage handling processes, there are specific steps such as check-in at the Olympic Village, baggage loading at the Olympic Village, baggage unloading at the airport, and temporary storage at the airport. The entire process involves 16 different processes. Third, it had high human resource requirements. To minimize errors in baggage transportation, it required significant human resources from various units to record and verify each piece of baggage at every stage. Fourth, lack of information transparency. Stakeholders could not access real-time information about the status of the baggage. If any issues arose during transportation, they had to rely on manual inquiries from the baggage handling units.
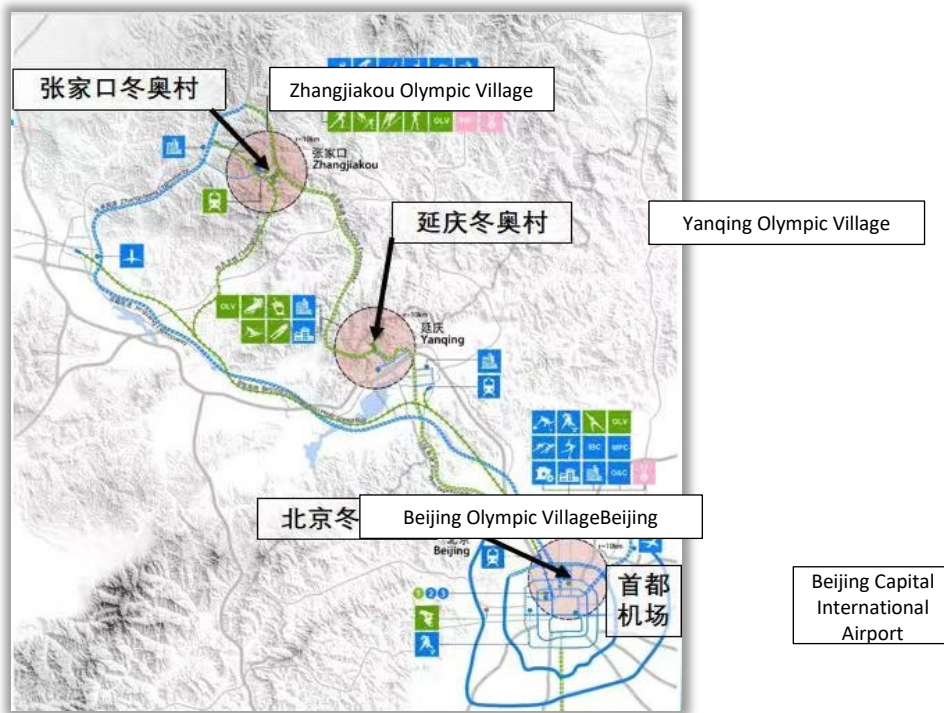
Diagram: Schematic Diagram of the Three Olympic Villages and BCIA

Business Process Design

Based on the basic processes of Olympic baggage transportation and considering the concerns of all parties involved, the "Olympic Baggage Tracking" system has set up with selected 12 core steps. These steps not only include 8 tracking points in the inbound and outbound processes at the dedicated areas for the Olympics within the Airport but also 4 links in the forward check-in processes at the three Olympic Villages, including check-in at the Olympic Village, baggage loading at the Olympic Village and unloading at the airport, as well as the temporary storage at the airport. Production system data is introduced at some of these points, and RFID baggage identification equipment is set up at key points to collect the necessary information for baggage tracking, providing the foundational data support for end-to-end baggage tracking. The specific process is as follows:
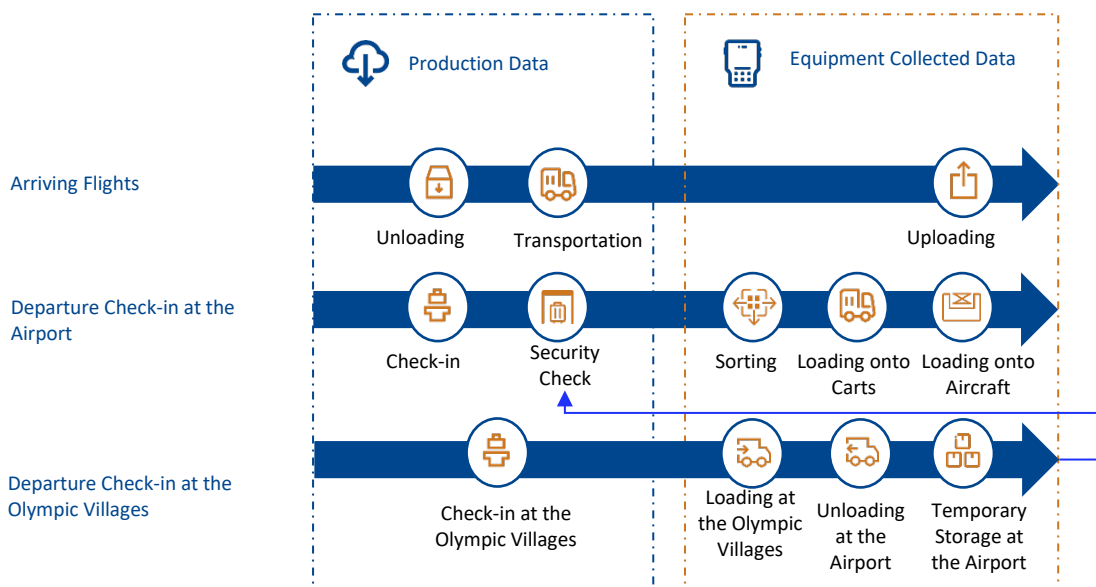

Diagram: Basic Handling Process for Winter Olympics Baggage Transportation

(II) Technical Implementation: Implementation at the Olympic Villages

The key to implementing the Olympic Village services lies in two aspects: first, solving the issue of generating baggage messages, and second, addressing the communication problem of mobile collection terminals (PDA). This solution extends the departure network of BCIA to the Olympic Village via a dedicated Internet line, and installs departure terminals in the Olympic Village to generate baggage messages. It also uses a 4G private network provided by the operator to enable remote communication for mobile data collection devices, thus ensuring smooth operation at the Olympic Villages. The specific setup is illustrated in the following diagram:
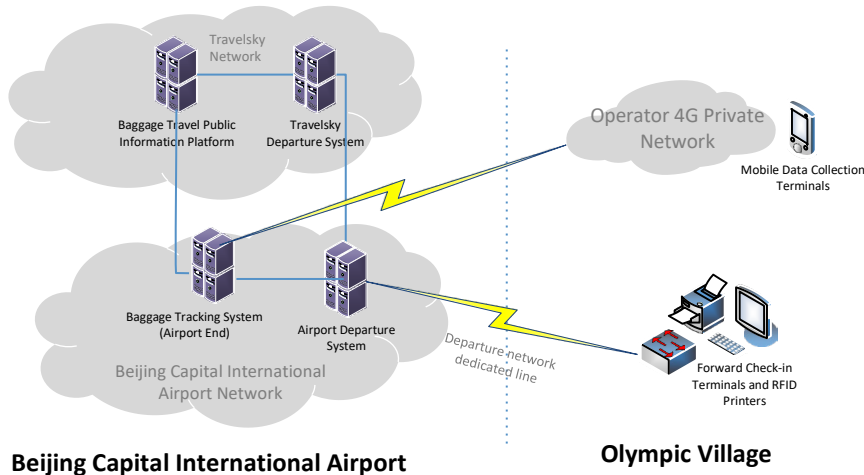
Diagram: Schematic Diagram of Olympic Village Service Implementation

Data Flow Design

The Winter Olympics Baggage Tracking System integrates multi-source data through extensive system interfaces. Internally, it connects with systems such as the departure system, security check, baggage sorting, big data platform, and baggage data center. Externally, it connects with systems like the arrival and departure information system, Baggage Travel platform, My 2022 APP, and airline systems. This design enhances data collection at each node while ensuring a seamless integration of both internal and external data. The specific data flow is as follows:

Diagram: Schematic Diagram of Winter Olympics Baggage Tracking Data Flow

Convenient Baggage Inquiry Service

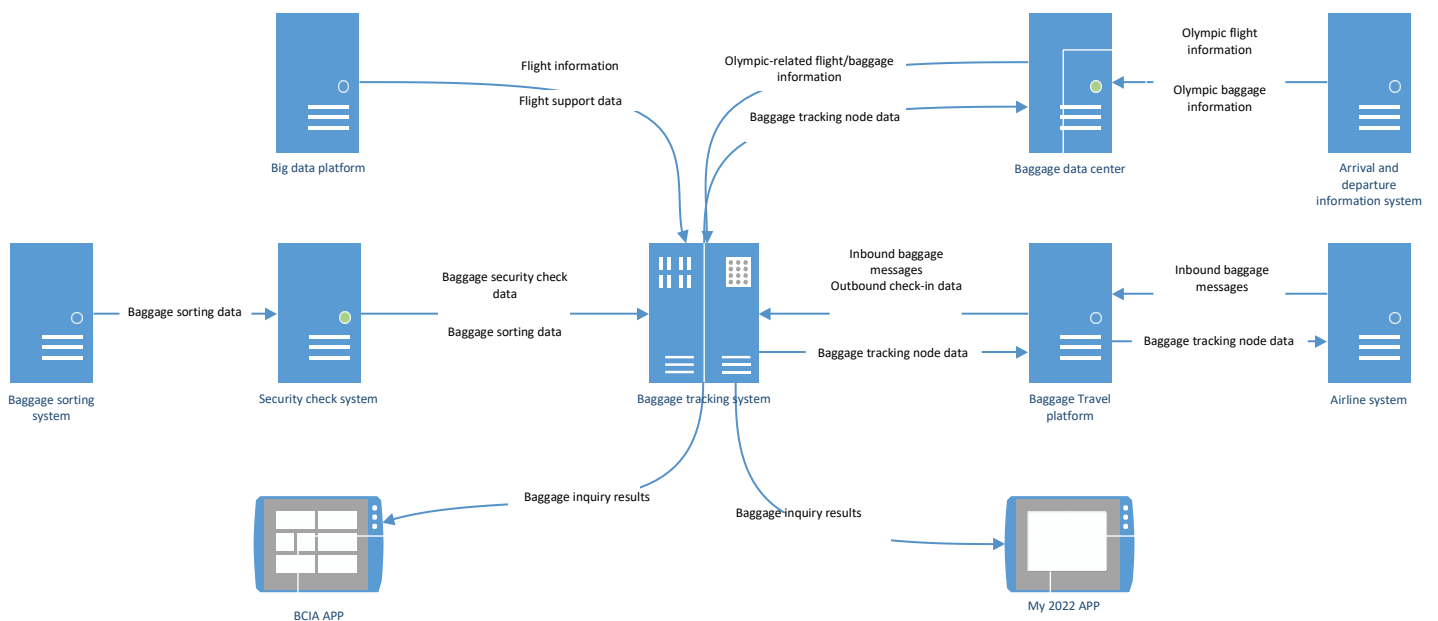To better serve the Beijing Winter Olympics, BCIA has closely collaborated with the Organizing Committee's Arrival and Departure Center to integrate baggage inquiry function into the official Winter Olympics application. During the Winter Olympics, athletes, media, officials, and other participants can directly use the My 2022 APP to check their baggage status, allowing them to monitor their baggage at any time and from anywhere.
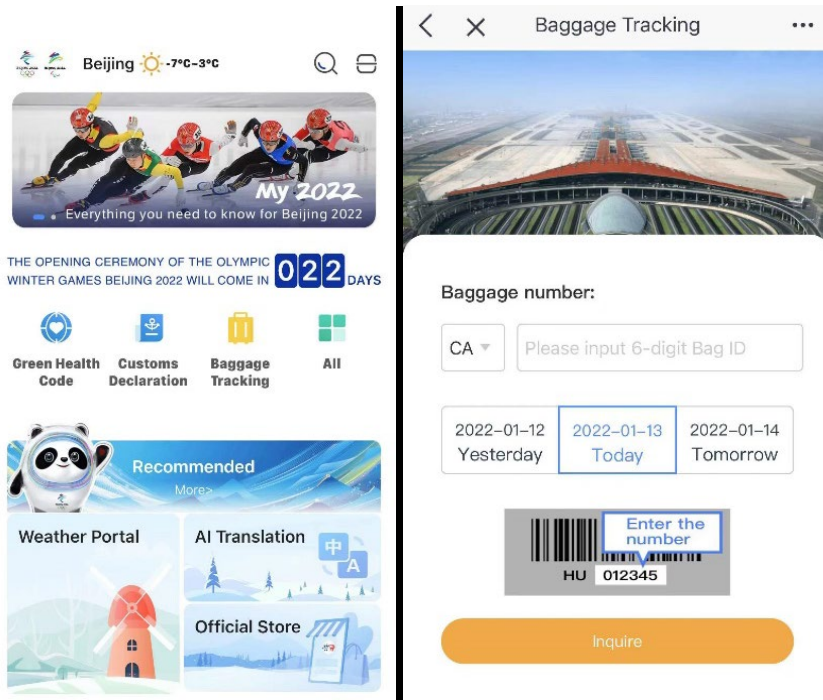
Diagram: End-to-End Baggage Tracking Service via the My 2022 APP

III. Experience Summary
(I) Experience Summary

1. **Technology Integration and Innovation:**

    o   RFID and barcode scanning technology were utilized to achieve full-process tracking of Olympic baggage, enhancing the automation and accuracy of off-airport baggage handling.

    o   Dedicated Internet networks and 4G private networks were deployed to address remote data collection and communication issues, ensuring the continuity of off-airport baggage tracking services.

2. **Cross-Functional Collaboration:**

    o   Close collaboration with the Beijing Winter Olympics Organizing Committee's Arrival and Departure Center helped to include the baggage inquiry function into the official application, thereby improving user experience.

3. **Data Sharing and Integration:**

    o   Interfaces were seamlessly integrated with multiple systems (such as departure, security check, and baggage sorting) to achieve extensive data collection and integration.

- o Data was shared with external platforms (such as the Baggage Travel platform and the My 2022 APP), enhancing the convenience and real-time nature of the service.

4. **Addressing Complexity:**

- o Faced challenges such as isolated locations, long transportation chains, numerous steps, and high manpower requirements, errors in baggage transportation were effectively reduced through technological innovation and process optimization.

5. **Information Transparency:**

- o Real-time baggage status query was realized, increasing information transparency and reducing the need for manual inquiries.

6. **Cost-Benefit Analysis:**

- o Detailed cost-benefit analyses were conducted during the business process design, leveraging existing in-airport baggage tracking system resources to achieve off-airport baggage tracking with minimal additional costs.

7. **Economies of Scale:**

- o As the service network expanded and the volume of baggage increased, economies of scale were utilized to reduce operational costs and improve economic efficiency.

(II) Major Challenges

1. **Remote Data Collection and Communication:**

- o Challenge: Remote data collection and communication between the three Olympic Villages and BCIA.
- o Solution: Implemented dedicated Internet network and 4G private networks to ensure real-time data transmission.

2. **Multi-Process Coordination:**

- o Challenge: Complex coordination involving 16 different processes.
- o Solution: Detailed business processes designed to ensure smooth transitions between each step.

3. **Lack of Information Transparency:**

- o Challenge: Stakeholders were unable to access real-time baggage status.
- o Solution: Provided real-time baggage query services through the My 2022 APP.

(III) Economic and Social Benefits

1. **Improved Baggage Handling Efficiency:**

- o Automation technology reduced the need for manual labor, increasing the speed and accuracy of baggage handling.

2. **Enhanced User Experience:**

- o Real-time baggage query services improved passenger satisfaction and trust.

3. **Reduced Baggage Transportation Errors:**

   o End-to-end tracking and real-time monitoring effectively reduced the risk of lost or delayed baggage.

4. **Increased Information Transparency:**

   o All stakeholders could access real-time baggage status, enhancing operational transparency.

5. **Provided Reference & Experience for Future Events:**

   o The success of this case provided valuable experience and technical references for baggage handling for future large-scale events.

Case Study 2: Baggage Off-airport Operations at Dongzhimen (Metro Station) City Terminal

I. Background

In 2008, Terminal 3 of BCIA officially began operations, and by 2021, the airport had completed the construction of a full-process baggage tracking system. For outbound baggage, data collection is achieved through RFID and barcode scanning technologies at each step, including check-in, security check, sorting, loading onto carts, loading onto aircraft, unloading after landing, and transfer points. In terms of data exchange, BCIA provides a baggage information sharing service that is synchronized in real-time with the Civil Aviation Administration of China's baggage tracking platform. This has created a big data center for baggage, covering the airport, airlines, and upstream and downstream airports, providing better support for the base operations of airlines.

II. Case Analysis: Technology, Processes, and Facilities

Based on the above baggage tracking system within the airport, BCIA has extended its baggage check-in/drop-off and tracking services to Dongzhimen city terminal at Metro Station.

(I) Business Process:

Construction and Development of the Dongzhimen (Metro Station) City Terminal:

The Dongzhimen City Terminal, as part of the supporting infrastructure for the 2008 Summer Olympic, is a component of the Dongzhimen Public Transport Hub. In 2018, BCIA initiated a city check-in project at the Dongzhimen station on the Capital Airport Express. This project is located in the non-fare areas of Beixinqiao, Sanyuanqiao, and Dongzhimen stations along the Capital Airport Express. It includes self-service check-in kiosks and flight information display screens, providing services such as boarding pass printing, flight information queries, and passenger inquiries. Passengers can directly access the check-in area via the Beijing Subway Capital Airport Express, enjoying convenient check-in services. This initiative allows passengers to complete their check-in procedures in downtown areas, significantly reducing waiting times at the airport and improving travel efficiency. Currently, BCIA has installed three sets of self-service baggage drop-off equipment and flight information display screens as well as other accompanying aviation facilities on the floors B1 and B2 of Dongzhimen station. Additionally, pre-security screening services have been added. These enhancements are expected to be operational by 2024, further improving the comprehensive transport hub functions of the city terminal and providing passengers with a seamless check-in experience comparable to that of the main airport terminals.

Business Process Design：

The check-in process at the Dongzhimen City Terminal includes three main stages: baggage reception and packing at Dongzhimen, transportation via the Capital Airport Express, and baggage drop-off at Terminal 3. After arriving at the city terminal, passengers undergo air-ready baggage pre-inspection, complete check-in procedures, and hand over their baggage for transport. Staff members load the baggage onto carts, seal the containers, and transport them via specialized elevators to the rail transit platform. The air cargo travels on a modified enclosed train to platform T3. Upon arrival at the platform, the baggage is unloaded from the train. After unloading, Air China baggage handlers open the containers and transport them to designated counters within the terminal using carts for delivery.
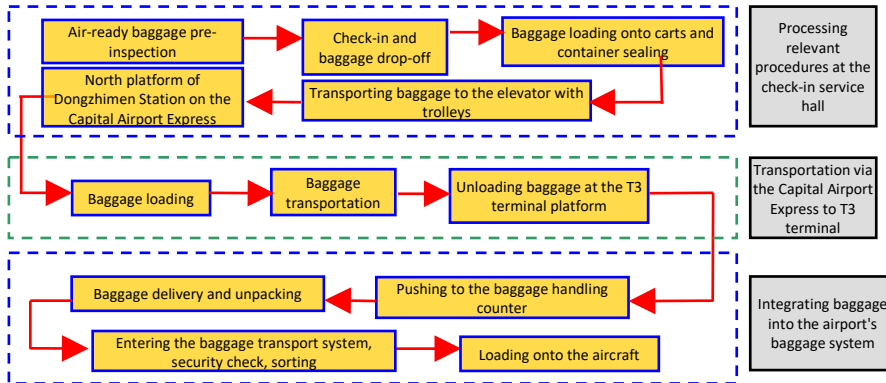
(II) Business Implementation:

In terms of investment allocation and management, BCIA is responsible for the investment in aviation-related equipment and subsequent maintenance, as well as providing "air-ready baggage pre-inspection" services. Air China, as the operating entity, will provide check-in and baggage drop-off services at Dongzhimen Station. The metro party is responsible for the investment in the supporting civil construction, ventilation and air conditioning, power and lighting, elevators, and vehicle modifications at Dongzhimen Station, and takes charge of train operation services and the management of areas within the station that fall outside the jurisdiction of CAAC.
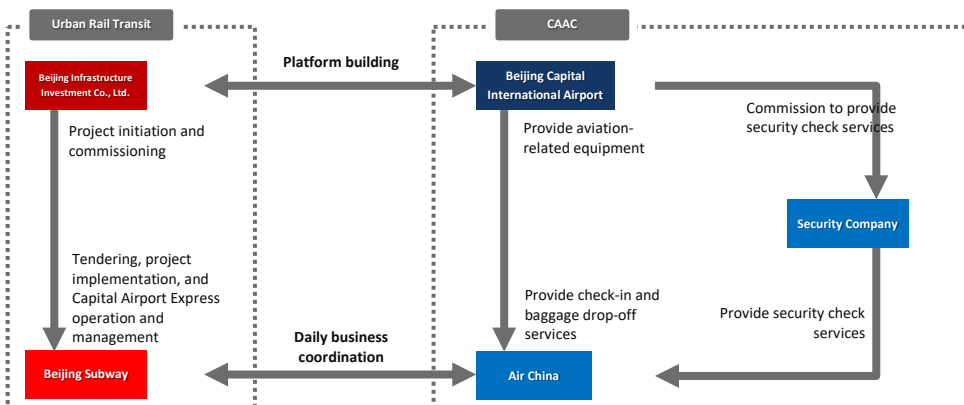
In terms of baggage tracking, BCIA has adopted RFID technology to achieve full-process baggage tracking and video surveillance sharing. During the check-in and baggage drop-off process at Dongzhimen, RFID tags are attached to the passengers' baggage. Upon arrival at Terminal 3, the existing counters equipped with RFID readers instantly collect the status information of the checked baggage. During the journey, passengers can use a mobile App to monitor the real-time status of their baggage, enhancing their sense of control over their

checked baggage and helping them to better plan their travel time. The application of this technology not only improves the automation level of baggage handling but also provides strong technical support for the accuracy of baggage tracking.

(III). Experience Summary:

- **Technology Application:**

  RFID and barcode scanning technology were utilized to track the entire baggage check-in process at the terminal, enhancing the automation and accuracy of off-airport baggage handling. Self-service baggage drop-off equipment integrating seat selection, boarding pass issuance, and self-service baggage check-in, was adopted to truly achieve a 'one-stop' self-service process for passengers. This not only reduces the manual effort required by check-in staff but also enhances overall efficiency.

- **Close Collaboration and Concerted Efforts:**

  Close collaboration was reached with airlines, customs, security companies, and railway operators, further enhancing the comprehensive transportation functions of the Dongzhimen City Terminal.

- **Information Transparency:**

  Real-time baggage status query services can be provided through the BCIA mini program, increasing information transparency and meeting the needs of manual inquiries.

(IV) Major Challenges:

- **Subway Station Renovation:**

  Challenge: Dongzhimen subway station is an existing station with limited space and complex property rights, making renovation difficult
  Solution: Optimized passenger flow design and process to ensure the functions of the city terminal without interrupting operations at the existing facilities.

- **Multi-Step Coordination:**

  Challenge: Complex coordination involving multiple stakeholders and numerous process nodes.
  Solution: Detailed business processes designed to ensure smooth transitions between each step.

(V) Economic and Social Benefits:

- **Strengthened Public Transport Hub Functions and Fully Leverage Its Potential:**

  Further improved and fully exerted the functions of Dongzhimen as an integrated transport hub.

- **Improved Rail Transit Service Levels:**

  Facilitated the convenience for passengers traveling with baggage on public transportation, alleviating the check-in traffic pressure at the airport terminals and ensuring timely travel of passengers to the airport.

- **Increased the Attractiveness of the Capital Airport Express:**

  Expanded the service coverage for air travelers, attracting more passengers to choose the Capital Airport Express, thereby reducing traffic pressure on the Beijing Capital Airport Expressway.

- **Provided Reference and Experience for the Development of City Terminals:**

  Offered valuable experience and technical references for the future development of city terminals in the airport industry, enabling off-airport check-in and baggage drop-off services.

Case Study 3: Baggage Off-airport Operations with China Southern Airline

Project implementation background

- Civil Aviation Administration of China (CAAC): encourage trial implementation of door-to-door baggage.
- Digital Transformation is one of the corporate strategies for China Southern Airlines. Door-to-door baggage service meets this strategic objective, and it helps to improve the passenger experience.

Project feasibility analysis

- Need
  - External factor: Passenger demand for personalized baggage services.
  - Internal factor: Business driving force to optimize and upgrade the traditional baggage services
- Gap
  - Current baggage services no longer meet passengers personalized preferences.

- Opportunity
  - Several third-party logistics companies started to provide baggage delivery service for passengers between off-airport premises and airport (hereinafter the term partner is referred to as the third-party logistics companies that China Southern Airlines cooperated with).
  - Shenzhen Airport (SZX)'s door-to-door baggage trial has proved the concept is workable.

Conclusion

Based on a comprehensive consideration of internal and external factors, China Southern Airlines decided to launch a three-step plan:

Step 1: RFID technology application

- China Southern Airlines has applied RFID (Radio Frequency Identification) technology in baggage tracking. It provides a new way of tag reading and data exchanging by combining optical scanning and RFID.
- Tools: PDA (Personal Digital Assistant) optical scanning, upgraded RFID tags, automatic confirmation equipment.

Step 2: Launch "airport-to-door" baggage service

- China Southern Airlines has launched the airport-to-door baggage service as the first domestic carrier in the local market in the year 2020.
- Place an order: passengers order the airport-to-door service in China Southern Airlines APP or web
- At arrival airport: passengers don't need to pick up baggage by themselves. Ground staff will perform the baggage claim and hand it over to partner staff. Partner staff will in turn deliver the baggage to the pointed destination 4-6 hours after flight arrival. Passengers shall receive and sign for the baggage at the final destination.
- If passengers need to take out necessities from the suitcase at arrival airport, they could pick up the baggage from the carousel and hand it over to ground staff to continue following the service.

Step 3: Launch "door-to-airport" and "door-to-door" baggage service

- China Southern Airlines has further extended its baggage services by launching "door-to-airport" and "door-to-door" options in July 2021.
- Place an order: once passengers complete online check-in, they can directly place an order on China Southern Airlines APP or HTLM5 page "m.csair.com". The order should be placed five hours before the departure time and passengers are requested to complete online check-in before placing an order.
- At home door: Partner staff will pick up the baggage at the passenger's home door within the specified time. Passengers must sign a security risk notification to confirm their baggage complies with the airport

- **Security regulation**. Partner staff will put the baggage into a protective cover and passenger will lock it with a combination lock. Passengers set the password for the lock and use it to open the protection cover at the final destination.
- **Ground transportation**: partner staff will transport the baggage to the airport with security measures placed. In compliance with China Southern Airlines standards, partner staff should be equipped with GPS tracking devices, baggage protection covers, combination locks, baggage insurance, and vehicle monitoring to ensure safe and secure ground transportation.
- **At departure airport**: partner staff will drop the baggage at the designated check-in counter and will inform the passenger of the security check result.
- Once baggage passed the security check, the electronic baggage receipt (FIG.1) will be created and pushed to the passenger through China Southern Airlines App.

FIG.1 Electronic baggage receipt,

- If there are any prohibited items in the baggage, partner staff will inform the passenger through phone call and the passenger must come to the designated counter to deal with it at latest one hour before departure time, otherwise the baggage will not be loaded.
- **At arrival airport**
- Door-to-airport: passengers pick up baggage on the carousel by themselves.
- Door-to-door: Ground staff will perform the baggage claim and hand it over to partner staff. Partner staff will in turn deliver the baggage to the pointed destination 4-6 hours after flight arrival. Passengers shall receive and sign for the baggage at destination.
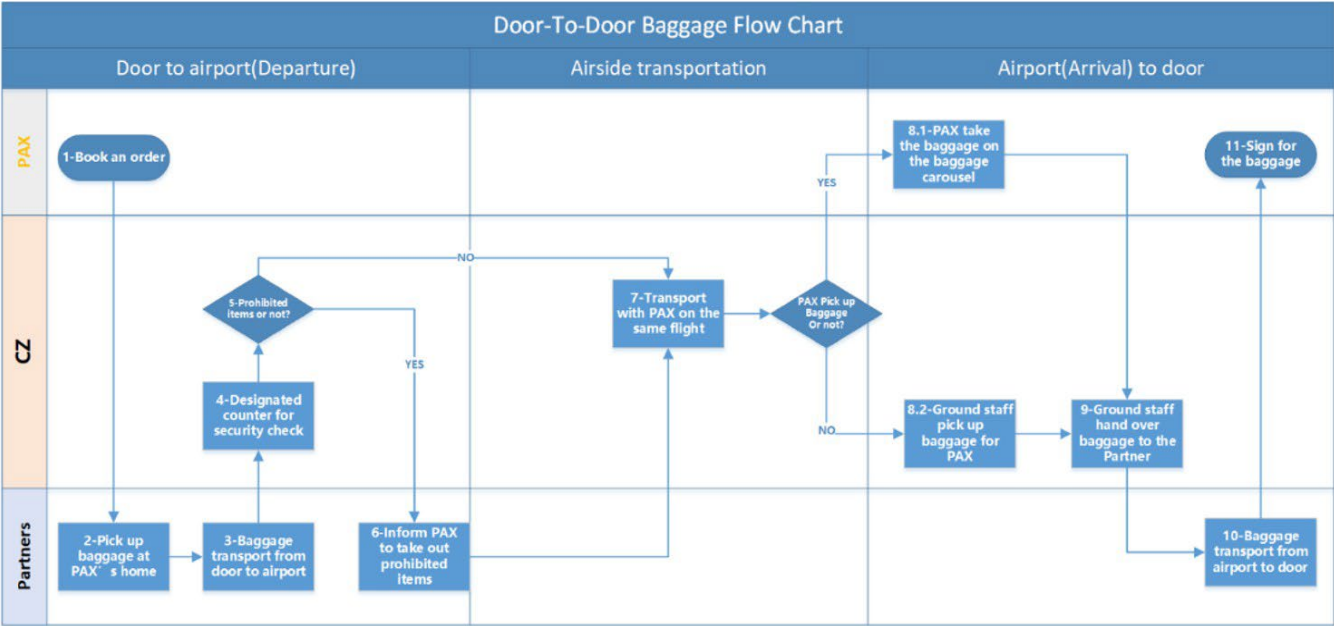

FIG.2 Door-To-Door Baggage flow chart

Network coverage

- China Southern Airlines door-to-door baggage service has covered 27 airport cities in mainland China by the end of November 2024, including Guangzhou, Daxing, Urumqi, Harbin, Shenzhen, Wuhan, Shengyang,Chongqing, Chengdu,Tianfu, Changsha, Taiyuan, Hongqiao, Pudong, Dalian, Haikou, Hefei,Changchun,Guiyang,Hangzhou,Kunming,Nanning,Nanjing,Ssanya,Xian,Zhengzhou,Zhuhai.
- China Southern Airlines will expand cooperation on door-to-door baggage service with more partners in year 2024 and try to have the service available across entire Airline's network.

BENEFITS

Level of Service (LoS): waiting time

- Since passengers no longer need to queue up for baggage drop at the check-in counter, it is estimated to save 10-15 minutes per passenger for baggage check-in.
- Since passengers no longer need to wait for the baggage at the carousel, it is estimated to save 20 minutes per passenger for baggage pick-up.

Reduce delays

- Sometimes passengers arrive at the airport late and miss the flight at the boarding gate as not sufficient time is left to process their hold baggage. If the baggage can be carried door-to-door, time would be more flexible for passengers to catch a flight.

Improve passenger satisfaction

- The door-to-door baggage service is very efficient, convenient, and hassle-free for passengers to deal with their hold baggage. It has been highly recognized by the market and most passengers who have experienced the service said they will recommend their family and friends to have a try.

Passenger / personnel health

- Help reduce physical touchpoints for passengers at the airport to ensure safe and hygienic travel amidst the COVID-19 pandemic.
- Reduce contacts between passengers and airport staff.
- Reduce contacts between passengers and airport equipment such as check-in and baggage drop kiosks.

Revenue growth : Benefit estimation

- China Southern Airlines carried about 50 million passengers traveling with baggage in the year 2019. With the off-airport service expansion, the airline expects a revenue increase for the coming years.
- The emergency of COVID-19 pandemic outbreaks has increased uncertainty about further revenue growth.

CONSTRAINTS

Regulatory constrains

- Civil Aviation Administration of China (CAAC) stipulates that passengers and their baggage must be transported on the same plane. Door-to-door baggage handling should also follow this rule.

Cost

- To better support the service, a dedicated system is vital to ensure accurate and smooth data sharing. China Southern Airlines has independently researched and developed a Baggage Information Exchange Platform. The R&D expense occupied a high proportion in the total cost.

Biggest challenge and solution

Door-to-door baggage delivery time

- Passengers normally have high expectations and requirements in terms of the delivery time of door-to-door baggage as travel essentials. They would like to have their baggage delivered shortly after they arrive at the final destination or even earlier. After several rounds of optimization, China Southern Airlines working with its partners was able to offer to passengers a very time-efficient delivery time as 4-6 hours after flight arrival.

Door-to-door baggage pricing

- Lack of pricing reference
- Since China Southern Airlines was the first carrier to launch this service in China, there was a lack of market reference of similar product prices. After taking into consideration similar courier service, air ticket fare as well as other ancillary services, "door-to-airport" and "airport-to-door" baggage services price proposition was made to passengers.
- Cost-based pricing is not applicable at the initial stage.
- The investment was comparably huge in the project's early stage while order volume was low. So, the expense can't be fully apportioned by service unit price at the beginning. Airlines should bear the "deficit" before reaching the break-even point.

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TECHNOLOGY, PROCESS & INFRASTRUCTURE REQUIRED

Service process

- The main service process of door-to-door baggage is described in the Background chapter.
- There are sub-processes to be applied for any disruptions occurred.
  - Prohibited items contained in baggage
    - If there are any prohibited items found in the baggage during the security check at the departure airport, partner staff will inform the passenger through phone call and the passenger must come to the designated counter to deal with it at latest one hour before departure time, otherwise the baggage will not be loaded.
  - Mishandled baggage
    - If the door-to-door baggage was mishandled like damage or delay, passengers shall contact partner staff to request further information. The problem will be escalated to China Southern Airlines once partner staff can't solve it.
    - Passengers do not board the flight
    - If passengers miss the flight, the door-to-door baggage will be offloaded accordingly.

Technical support

- New technologies applied to enable baggage information collection and baggage tracking like RFID, GPS and optical scanning etc.
- A dedicated Baggage Information Exchange Platform was deployed for data management and sharing.

Security measure facilities

- GPS tracking devices
- Baggage protection cover and combination locks
- Vehicle monitoring

FIG.3   GPS Tracing Devices   **FIG.4   Baggage Security Locks and Protection Cover**

FIG.5   Vehicle monitoring

LESSONS LEARNED

- The door-to-door baggage service offers passengers an extra option to deal with their baggage easily. From passenger's perspective the service is convenient, efficient, and hassle-free. However, from airlines' point of view this service is complicated to organize since there are multiple stakeholders involved in the entire process. Among all the factors, accurate and reliable data are vital to the service success since all stakeholders need data to perform their sub-processes. Therefore, China Southern Airlines has been put great efforts on data governance and system development to guarantee a solid foundation for upper layer door-to-door baggage service.

Baggage data collection and integration

- Order information: passenger places an order in China Southern Airlines APP and the order information will be sent to partner through data synchronization.
- Offsite data: partner performs pick-up and ground transportation process and sends baggage status data to airlines: booked and dispatched, to be collected, received, forwarded, out for delivery, delivered.
- Onsite data: after the implementation of IATA Reso.753, CZ is capable to collect baggage data from airport onsite touchpoints including acceptance, load, transfer and arrival.
- Data integration: the door-to-door baggage service requires the integration of order, onsite and offsite baggage data, to enable airlines as well as passengers to monitor baggage status throughout the whole journey.

Baggage Information Exchange Platform

- A dedicated platform has been developed to maintain and share baggage data/information.
- China Southern Airlines has been working with multiple partners for door-to-door baggage service in different locations. Partners run their own system with different interface standards which increase the complexity of data exchange. Thus, a unified interface standard for door-to-door baggage would bring great value to the industry as it will help to facilitate the data sharing among all stakeholders: China Southern Airlines is willing to work with any entity on this standard-setting concept.

Case Study 4: Off Airport Check-In Passenger & Bag same flight

1. Background

Emirates, renowned for its exceptional service and global reach, introduced off-airport check-in services to revolutionize the passenger check-in experience. These services cater to individuals, families, tourists, and groups, enhancing convenience and reducing airport congestion. By decentralizing check-in processes, passengers can complete check-in formalities at their homes, hotels, or other preferred locations, leaving them free to travel to the airport unencumbered. Emirates outsourced the home check-in service to DUBZ, which specializes in innovative baggage handling and check-in solutions, integrating technology to streamline operations while ensuring strict adherence to security protocols. This collaboration has transformed how passengers prepare for flights at Dubai International Airport.

2. Business Need

The global aviation industry faces immense challenges and opportunities, including a projected doubling of passenger numbers from 2024 to 2042 and a 2.5-fold increase by 2052. With constrained airport capacities and workforce scaling difficulties, traditional check-in models struggle to meet rising passenger expectations. A survey indicates that 75% of passengers with baggage prefer to reach their boarding gates within 45 minutes. The collaboration between Emirates and DUBZ addresses these challenges by:
- Enhancing passenger mobility and reducing airport congestion.
- Flattening operational peaks to optimize airport resources.
- Providing alternate options for customers to do check-in based on their preferences and needs.
- Promoting sustainability by encouraging public transport use, as passengers are free from baggage handling concerns.
- Enhancing accessibility for diverse passenger groups, including travellers with limited mobility, families and tourists.

3. Challenges and Solutions

Adoption of off-airport check-in services has historically been low due to several challenges:
- **Lack of Standardization:** Airports and airlines often lack consistent off-airport check-in protocols.
- **Regulatory and Security Concerns:** Approvals from relevant authorities are crucial but complex.
- **Low Market Awareness:** Many passengers are unaware of the availability and benefits of such services.
- **Marketing Limitations:** Insufficient budgets to promote off-airport services.

Emirates overcame these barriers by:
- Engaging with regulatory and security authorities to establish robust approvals and compliance frameworks.
- Implementing rigorous Standard Operating Procedures (SOPs) mirroring airport check-in standards.
- Leveraging Emirates' and DUBZ's marketing channels to raise awareness among diverse passenger segments.
- Customizing product offerings, such as premium services for First Class passengers, paid options for economy travellers, and specialized group services for sports teams and corporate groups.

4. Implementation Strategy

The implementation of the home check-in service for Emirates passengers in Dubai, provided by DUBZ, reflects a meticulous integration of technology, operational excellence, and regulatory compliance. Drawing from the

Standard Operating Procedures (SOP) established for this service, the following outlines the key steps undertaken to ensure its success:

- **Customer-Centric Solutions:** The service was designed to cater to the diverse needs of Emirates passengers in Dubai, including individuals, families, corporate groups, and sports teams. The booking process is customer-friendly, allowing passengers to schedule the service up to 48 hours before their flight, with final pick-up cut-off times as close as six hours prior to departure. This flexibility aligns with Dubai's status as a global hub with varying passenger profiles.

- **Operational Execution**
  1. **Agent Training and Preparedness:**
     - Agents undergo rigorous training on Emirates' check-in systems, policies, and procedures, including security protocols and baggage handling.
     - Daily equipment checks, including laptops, scanners, and portable baggage scales, ensure readiness before deployment.
  2. **At the Customer Location:**
     - Upon arrival, the agent updates their status in the DUBZ app and assists passengers with their baggage.
     - Travel documents are verified using Emirates' applications, and API protocols are followed.
     - Security questioning is conducted for each passenger to ensure compliance with aviation safety standards.
     - All acceptance procedure including baggage weighing and excess charges follows Emirates processes.
  3. **Baggage Handling and Security:**
     - Once the check-in process is complete, baggage is sealed with safety locks, and details, including images, are logged in the DUBZ app.
     - Each bag is scanned with a barcode reader to ensure accurate tracking throughout the journey.
     - The baggage is loaded into a secure, CCTV-monitored cargo area within the agent's van, which is secured with an electronic lock.
  4. **Airport Drop-Off**
     - The agents deliver baggage to designated drop-off points at Dubai International Airport (DXB), such as Emirates' Early Baggage Check-in Area at Terminal 3.
     - At the airport, Emirates staff ensure all details match before the baggage is released into the airport system.
     - The entire process from baggage collection to airport drop-off adheres to strict timelines to ensure the baggage reaches the aircraft on schedule.

- **Technology Integration:**
  - The DUBZ application along with Emirates applications play a central role in streamlining operations:
    - **Booking Management:** Passengers book and manage their services through an intuitive online platform.
    - **Real-Time Updates:** Passengers receive notifications at key milestones, such as baggage collection and drop-off.
    - **Operational Monitoring:** Agents update the app at each stage, from arrival at the customer's location to final delivery at DXB.
  - Integration with Emirates systems ensure seamless application of airline procedures and rules, such as baggage allowances, document verification, and advanced passenger information.

- **Scalability and Compliance**

- **Operational Scalability:** DUBZ employs resource planning and route optimization to manage high passenger volumes, particularly during peak travel periods such as holidays and summer.
- **Security Compliance:** The service operates under strict security protocols approved by local regulatory authorities and airline and airport security.

- **Stakeholder Collaboration:**
  o Continuous alignment with DUBZ ensures service quality and operational synchronization. Regular updates and feedback loops allow for enhancements based on passenger and airline requirements.
  o Coordination with airport authorities enables smooth integration with DXB's baggage handling and screening systems.

This strategy has successfully translated into a seamless and secure experience for Emirates passengers in Dubai, ensuring that their travel begins in a convenient and stress-free way. By tailoring the implementation to Dubai's unique demands, this product has set a benchmark for off-airport check-in services globally.

5. Business Benefits Realized

This product has delivered significant business and operational benefits:
- **Enhanced Passenger Satisfaction:** Streamlined check-in processes and reduced airport wait times contribute to high satisfaction ratings of 4.9/5 on Google Reviews from Emirates passengers who used the service, and positive feedback from premium Emirates passengers (First Class, Skywards Premium members) who utilized the service.
- **Reduced Airport Congestion:** The home check-in service is often advertised prior to busy travel seasons as a solution to alleviate pressure on airport facilities during peak travel periods, in addition to Emirates other off-airport check-in solutions that are in fixed locations in Dubai and Ajman.
- **Sustainability:** Encourages the use of public transportation by simplifying baggage management for passengers.

6. Key Lessons Learned

- **Stakeholder Alignment:** Continuous collaboration with all stakeholders has been essential for the program's success.
- **Operational Flexibility:** Adapting resources and services to meet varying passenger volumes and preferences is crucial. Dubai is a fast-growing city with roads and traffic often changing, so managing Dubai's traffic and logistics challenges effectively through route optimization is crucial for the service to continue to be fit for purpose.
- **Customer Expectations:** Tailoring solutions to passenger requirements enhances the service uptake and satisfaction.

7. Conclusion and Recommendations

The product exemplifies how technology and collaboration can redefine the passenger experience. By decentralizing airport operations, the initiative demonstrates the potential for scalable, secure, and sustainable travel solutions.

Appendix 2: Training Requirements for Service Providers

- Please refer to the latest IATA Airport handling manual Chapter 11 "Ground Operations Training Program" for trainings related to staff involved in handling passengers and basggage at an off-airport site.