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From DCS to Delivery

Fulfilling the retailing promise with traveler centric journeys and better operations

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Traveler-centric delivery management

The transition to modern delivery management systems presents an opportunity to completely transform the way airline services are delivered.

When combined with the core value provided by a consistently defined, individually priced and personalized product bundle (an offer) and a single, reliable, source of the truth (an order), the entire offer, order and delivery system can work together to deliver far greater traveler-centricity.

Our vision is for a modern, retail-focused approach to delivery, one that helps airlines generate incremental revenue, reduce costs, improve efficiency and build satisfaction by delivering better journey experiences.

Delivery systems sit at the heart of an airline's operations, between retailing and the airport service points, which themselves are being transformed with greater self-service and biometrics for faster and more convenient experiences.

In our view, delivery management should comprise two separate but closely linked modules. 'Journey delivery' involves coordinating multiple processes, including automating order processing, logistics planning and monitoring delivery progress.

It also provides airlines with an operational view and real-time tracking through a single view of operations, yielding valuable data insights that improve performance and enhance the customer experience .

'Service recovery'- the decision making and recovery of the customer during disruption, which can be significantly enhanced when closely linked to journey delivery.

These modules should operate independently and in conjunction with any other system an airline wishes but when used in combination will support better decision making and improved outcomes.

By placing the traveler at the center of everything we can greatly simplify today's experience and reduce queues. Outdated processes that add little value, like check-in, can be retired.

Travel document checks like visas and even border checks can be completed digitally before passengers arrive at the airport so terminals can be re-focused on retail and leisure.

In addition, we expect delivery will continue to facilitate crew and staff travel using offer and order processes.

We can provide a better experience by empowering every touchpoint in the passenger's journey with ways to easily identify the traveler and their entitlements. We can remove the need for travelers to continually explain who they are and present multiple documents during each interaction.

We can grow revenue by transforming the role of agents, so they are empowered to deliver truly personalized service wherever travelers require it, whether in-flight or throughout the airport. We can personalize the journey with relevant offers made available via agents, self-service touchpoints or the traveler's mobile device.

We can improve on-time performance, flight turnaround efficiency and the passenger experience by gaining a single view of flight operations that's made available to decision-makers, back-office and frontline agents. Operational processes and decisions can be continually optimized using new data assets in combination with machine learning.

We can make service recovery a differentiator by responding more quickly, with more complete, multi-modal options, that ensure traveler entitlements and preferences are reflected across partners during disruption.

With new capabilities we can overcome many of the persistent challenges airline operations teams face daily, like facilitating group travel; baggage issues; difficulties when interlining; disruption management; regulatory requirements and meeting the needs of passengers that require special assistance.

This smooth and simple journey experience can be enabled by new delivery management technology that builds on the benefits of offer and ONE Order to make it easier to share data, to connect airlines with their ecosystem of partners and to make traveler context available when and where it's needed.

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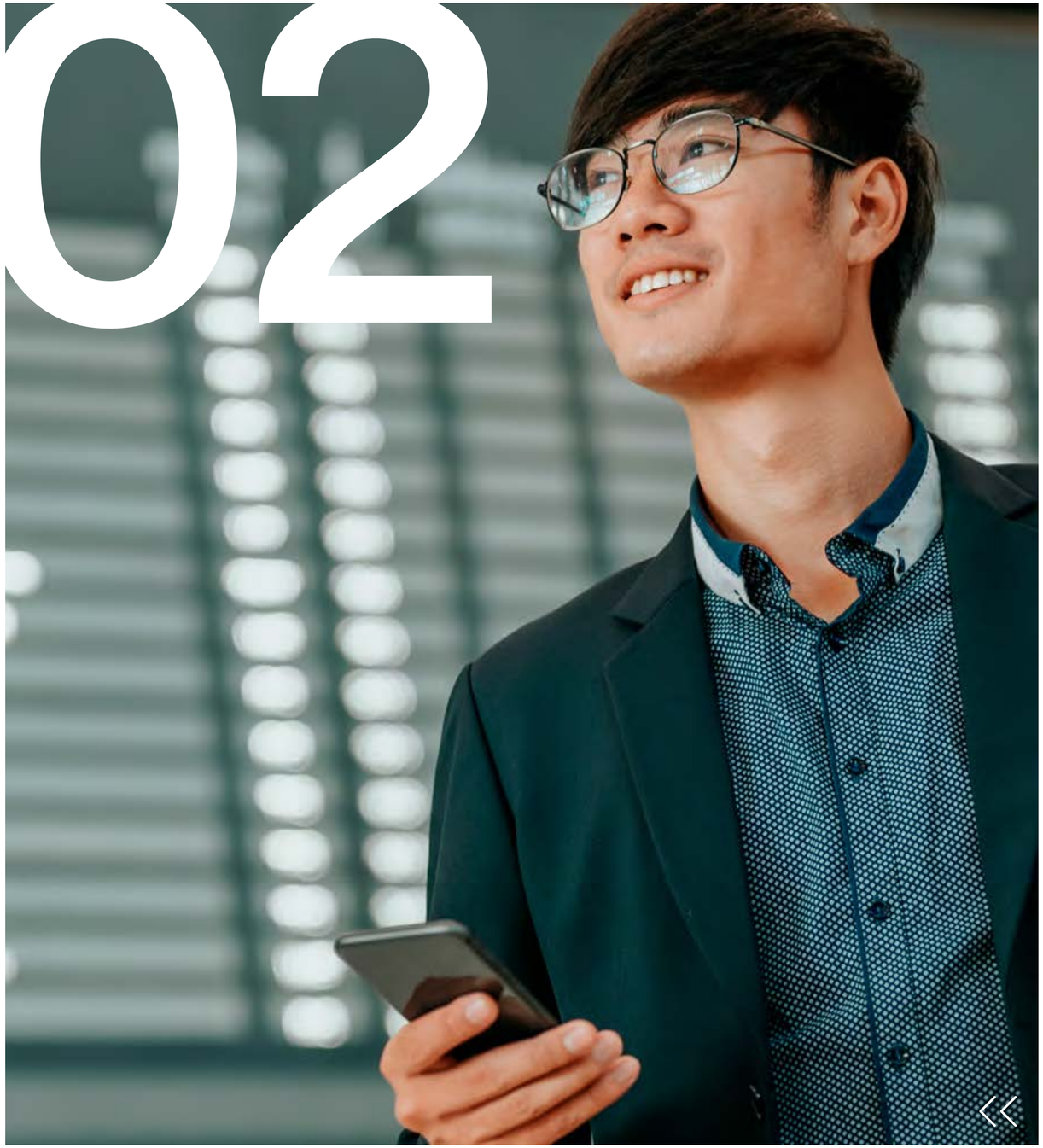


Guiding principles

At Amadeus we believe delivery systems are necessary in an offer and order world, providing a mission critical system that can deliver the passenger's order (the products that are committed to be delivered) by facilitating a wide range of experiences, supporting airlines to grow revenue and improve operational efficiency.

Delivery will also play a crucial 'feedback' role, continuously providing an airline's offer system with journey context to make more relevant and attractive offers.

What's already clear is that no two airlines are the same and there is likely to be a broad spectrum of requirements. Some airlines will only need a simple delivery system to handle fulfillment of their own orders whereas others will need the system to track and orchestrate the delivery of services from a wide range of third-party partners across the entire journey.

After significant consultation with airlines among our Delivery Management Champions Group, we have identified more than 400 individual requirements for the new system.

The majority (60%) focus on improving customer experience and operational performance, roughly a third are focused on removing system constraints present with Departure Control Systems (DCSs) and a further 10% relate to seamless integration with other systems.

From this work with airlines, we have identified several guiding principles for future delivery systems, with one 'master' principle.

Traveler-centricity: our guiding principle

Above all else, the main opportunity identified by our working sessions is the ability for delivery to become traveler-centric.

With traveler-centricity we aim to build long-term relationships that foster loyalty and advocacy. We achieve it by understanding traveler needs and aligning airline products and services to meeting those needs during every interaction.

From a delivery perspective, this requires the system to understand the traveler's unique journey context and to make it easily available everywhere. It also requires that airlines make best use of this traveler understanding to proactively anticipate and respond to the needs of the traveler during the journey.

In the context of travel this often comes down to ensuring the traveler is well-informed and presented with satisfactory choices, particularly when things change. From a technology standpoint, this requires 'events' to be intelligently presented so automated actions can be triggered.

It also requires a unified traveler profile based on correlated data, which forms the foundation of a unified view of the traveler. In Amadeus' case, our Creation Platform is the enabler for both of these capabilities within Amadeus Nevio.

Example:
DELAYED BAGS

Delivery presents an immediate opportunity for airlines to make baggage more traveler-centric.

By flowing data from the bag drop points, Baggage Handling Systems and Baggage Reconciliation System (BRS) delivery will know if a traveler's bag is delayed.

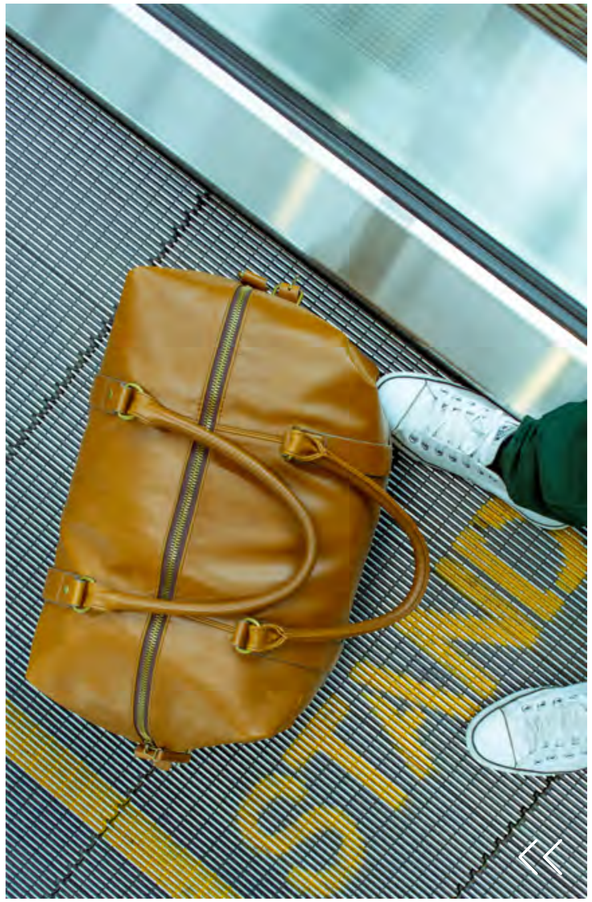
If it isn't in the hold, the airline can let the traveler know via its app and organize onward delivery, avoiding the need for the passenger to queue and complete a lost bag form.

We also anticipate that travelers will be able to share their own tracking information, perhaps from an Apple Air Tag or equivalent, with delivery to further improve the baggage experience while reducing dependency on 'lost and found' systems.

Example:
SPECIAL ASSISTANCE

Offer and order systems will know if a traveler has previously required wheelchair assistance and can add this as standard, so wheelchair assistance appears as a service item within the order, alongside service items the passenger has paid for e.g. lounge access.

The requirement for wheelchair assistance (including ad hoc requests) will be made available across all key stakeholders in the journey to ensure seamless, pro-active, provision of special assistance.



Additional guiding principles

OPEN AND MODULAR

Delivery systems should be open and modular so they can easily connect to the airline's offer management and order management systems, as well as integrating with flight operations, airport and non-air systems at touchpoints across the traveler's journey.

OFFER AND ORDER NATIVE

Free from traditional industry standards like ticketing, Passenger Name Records and codeshare so airlines can benefit from real-time and contextualized retailing based on the latest industry standards.

DATA ENABLED

Delivery systems must be customer and flight-centric, which is enabled through modern approaches to data management.

Harnessing new event-driven architecture is the key to ensuring delivery systems can feed data and events in real-time to other systems.

This means an airline will understand the behavior of its customers at all touchpoints and can make personalized and helpful offers at the right moment.

This capability is also the key enabler that helps airlines bring together a view of a passenger, their entitlements and preferences with the status of flights and what can practically be delivered, helping to best match these two sides of the coin for optimal delivery and recovery.

In Amadeus' case, we achieve this with our Creation Platform, providing the event-driven architecture that underpins our airline retailing technology (Amadeus Nevio).

SIMPLIFIED CUSTOMER SERVICE AND FLIGHT OPERATIONS

Delivery systems must support simplified processes, for example removing the DCS window to support continuous retailing and retiring check-in and even today's concept of a boarding pass.

Instead, new capabilities will be introduced that support a better customer experience and more efficient operations.

AUTOMATED AND OPTIMIZED

Underpinned by a data platform, in Amadeus' case our Creation Platform, delivery systems will support greater automation and optimization, powered by machine learning across journey delivery and service recovery.

Such continual optimization improves prediction, which in turn improves performance and ultimately the traveler experience.

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Key capabilities of future delivery systems

Delivery management systems will include a number of key capabilities that help airlines maximize revenue, improve the traveler experience, and operate more efficiently.

These new capabilities will completely transform the experience of travel, simplifying key processes and ensuring the industry is empowered to deliver an outstanding experience across the journey.

03.1 | Grow revenue with personalized retailing

Airlines will be able to drive additional revenue by making personalized offers to travelers at all physical or digital touchpoints at the airport and beyond.

The airport represents a significant retail opportunity. Whether it is a flight or seat upgrade, lounge or boarding priority, or even special equipment for a pet, there are opportunities to match customer needs with an airline's own products.

Perhaps more interestingly, there are also opportunities to offer third-party products like security fast-track, food & beverage or destination experiences.

The move to delivery means airlines will be able to harness capabilities from their offer and order systems to personalize retailing at the terminal, which will become far more sophisticated, based on the traveler's current context and their broader profile.

RETIRING THE DCS WINDOW

The DCS window refers to a period, typically 24-48 hours before flight departure, when the DCS assumes responsibility for the passenger from the airline's commercial system. During this time, it has not typically been possible to harness full commercial capabilities to retail effectively.

The industry will no longer be constrained by the 'DCS window' . Instead, airlines will be able to maintain a continual commercial relationship with the traveler. From shopping on the website to the airport and beyond, delivery systems will help airlines understand where the traveler is in the journey and the mix of services they are most likely to need.

Delivery will not contain its own retailing capabilities but instead will draw on the capabilities in offer to avoid unnecessary duplication and cost.

03.1 | Grow revenue with personalized retailing

RETAILING EXAMPLE: SERVICE ENHANCEMENT

A passenger arrives at the terminal early, perhaps four hours before departure. The delivery system understands this because the passenger has consented to share the location of their mobile phone through the airline's app.

This information is provided to offer, which draws on a detailed profile such as Amadeus Traveler DNA to understand this is likely to be a business traveler (even though they are booked in economy).

With a real-time view into flight and seat availability offer knows seats are available in business class on an earlier flight. The passenger then receives a pro-active 'pop-up' offer with the choice to upgrade to business on an earlier flight which the traveler buys. The passenger's order is automatically updated with the new entitlement.

The above example demonstrates how passenger events at the airport can be combined with retailing capabilities from offer to personalize the traveler's experience whilst driving incremental revenue. Such pop-up offers are a key retailing benefit that will help airlines maximize revenue at any touchpoint.

Beyond the airline's own use of this location information, it can also be logged within the passenger's order, so it can be shared more widely across the airline's ecosystem of partners to drive more business opportunities. For example, if the passenger arrives early, perhaps they would also benefit from an earlier hotel check-in.

DRIVE IMPROVED SATISFACTION WITH SEATING AS A TRUE PRODUCT

The way airlines handle seats will also improve. Rather than assigning a passenger seat 5A the airline will instead retail the seat based on its attributes e.g. a window seat with extra legroom.

Based on the seat map and attributes in the passenger's order a seat is assigned. If there is an operational need to change the seat the traveler can be informed earlier, avoiding frustration associated with last-minute seat changes.

Delivery coordinates the final weight and balance checks. On the few occasions when seat changes are still required, perhaps due to weight and balance requirements, then delivery will proactively update the passenger's order.

If the passenger is reassigned to a less valuable seat, then the compensation process is pro-active, and the traveler can be informed about their compensation options before boarding. Similarly, we also anticipate an option for airlines to retail cabin bags and space in the overhead locker as a more structured entitlement.

03.2 | Simplify the traveler experience with ‘ready-to-fly’

Airlines will be able to drastically improve the traveler experience and operational efficiency as travelers will be ‘ready-to-fly’ when they arrive at the airport.

Traditional check-in and travel document checks e.g. visa checks at the terminal will no longer be needed, meaning travelers can drop their bag, using the baggage acceptance capabilities of delivery, and move smoothly to security. Even bag-drop can be avoided if the passenger chooses a door-to-door bag pick-up and delivery service from the airline.

This change will improve passenger processing speed, free space at the terminal and help to reduce costs for airlines.

RETIRING CHECK-IN

In many parts of the world airlines will be able to retire traditional check-in if they choose. This can be achieved using a mix of continual engagement to understand the traveler’s intention to fly and new abilities to track the passenger’s location.

There are a wide variety of technologies that make it possible for a delivery system to understand if the passenger looks likely to board the plane. Travelers that consent to sharing their location with the airline provide real-time location via the airline’s app, a common practice when taking a ride hailing service.

Airport touchpoints like bag drop, kiosks and the lounge provide cast-iron certainty that the passenger is in the terminal.

Airlines will also have the option to engage passengers through digital channels to help ascertain if they intend to travel.

MODERNIZING THE AIRPORT PASSENGER EXPERIENCE

With no need to check-in, there will be far greater flexibility for airlines to design the airport experience they choose.

For example, fixed desks could be phased out with roaming agents serving travelers from a tablet, empowered with access to each traveler’s unique context and entitlements. Alternatively, an airline may choose to prioritize self-service at the airport, or a mix between agent-led and self-service.

RETIRING TRAVEL DOCUMENT CHECKS AT THE TERMINAL

The airline will be able to anticipate any visas required by the traveler by consulting with a ‘regulatory hub’ ensuring travelers are prompted to organize the required documents before travel and that the order is updated. Passengers can complete documentation digitally in advance, further simplifying the airport experience.

BRINGING BORDER CONTROL CHECKS FORWARD

Although not strictly a function of delivery, government document checks can also be brought forward using new technology, so they can be undertaken before the traveler reaches the terminal, further improving the experience at the airport.

This vision has already arrived with the Curaçao Express Pass, the world’s first pre-flight biometric digital identity verification for a contactless border crossing which went live on 01 July 2024.

Utilizing the Curaçao Express Pass, travelers verify and share their electronic passport and biometric information with the immigration system well before arrival, using their smartphones. Travelers then access an expedited immigration lane upon arrival where a biometric check occurs, allowing travelers to walk through immigration upon police backends’ clearance.

03.3 | Transform the traveler experience at every touchpoint with the journey code

Airlines and their partners will be able to deliver an outstanding and personalized service at every touch point by instantly understanding the traveler, their entitlements and the context of their trip using the traveler's unique journey code.

When we travel today it is common to present multiple documents, e.g. a boarding pass at the airport, a car rental confirmation or a hotel reservation confirmation at the front desk.

As travelers, we constantly need to explain the services we're entitled to as well as using documents like passports to prove who we are.

The unique journey code concept is the key to ensuring every supplier can quickly reference each individual passenger's entitlements for their specific step in the journey.

INTRODUCING THE JOURNEY CODE

Currently in development, the journey code is a technical reference that will be used by travel service providers, which is not visible to travelers. It will link the order ID and passenger reference, enabling efficient data retrieval and seamless interaction between systems.

It will form a one-to-one reference between an individual and their entitlements within an order, which is necessary as an order may contain several different travelers, each with different services and itineraries.

In a fragmented industry like travel, we know touchpoints along the journey will support different methods of identification. For example, biometrics and NFC readers will not be available everywhere.

The journey code supports all methods of identification, acting as a 'common denominator' to ensure interoperability throughout the trip.

We envisage the journey code as an industry standard way to quickly reference the traveler's entitlements from their order.

Once key touchpoints in a journey support different methods of authenticating the traveler (e.g. passport or biometrics) the traveler can choose to pair their journey code to their identification method.

From the traveler's perspective, they can then present their chosen authentication method (biometrics, QR code, etc.) at the airport, car rental, hotel front desk or theme park so their entitlements and preferences are known in an instant, removing the need to present a range of different documents.

In certain circumstances, like domestic flights, all a passenger will need to do is scan a QR code stored on their phone with a QR code reader to board the aircraft, supporting extremely fast passenger processing.

03.3 | Transform the traveler experience at every touchpoint with the journey code

From a delivery perspective the information flow is two-way. For example, the passenger's order will be continually updated so an airline will understand if a traveler has accessed the lounge or checked in for the hotel.

This will provide even more information that can support personalized retailing and servicing, whilst ensuring data privacy.

Backward compatibility is vital during the transition period, ensuring smooth operations even when not all stakeholders have yet adopted the new system.

That's why the journey code is designed to work with both new order systems and existing systems.

Example:
GROUP TRAVEL

Even when an order originates from a travel seller and even when there are several travelers in a single order (all with differing itineraries) having a journey code to easily reference each individual's entitlements makes travel smoother, easier and more personalized across the journey.

For families, the journey code can be adapted to cover everyone in the family e.g. children, so parents or guardians can more easily facilitate their travel.

THE EVOLUTION OF THE BOARDING PASS

With the journey code as an enabler, travelers will no longer need traditional static boarding passes, hotel and car reservation documents.

These are replaced by dynamic information provided to the customer, covering their entitlements, baggage status, next steps in their journey and embedded retailing options.

This provides the traveler with dynamic information as they progress through the journey. Simple examples would include reflecting a gate or seat change and including wayfinding information at the airport.

03.4 | Orchestrate the end-to-end journey with retailer : supplier workflow

Airlines will be empowered to understand the delivery status of every element of the traveler's order, improving the customer's experience throughout the journey and providing a powerful differentiator that builds loyalty.

Journey orchestration will be significantly better than today due to the single source of truth provided by a single order, and the ability of the Order Management System (OMS) to share and receive, real-time updates on the fulfilment status of the order with all suppliers.

An airline's Delivery Management System will play an important supporting role by feeding the OMS with real-time fulfillment status updates.

WHAT IS JOURNEY ORCHESTRATION?

In an offer and order world, journey orchestration refers to communication and interactions between the retailer and the various suppliers involved in the order. IATA has defined standards to guide such interactions, known as 'retailer : supplier'.

Example:
RETAILER : SUPPLIER WORKFLOW

The retailer receives a request from the traveler and then receives a proposal and price from a supplier to provide that service. Once the traveler commits to paying for the service, the retailer confirms with the supplier to secure the inventory (e.g. a hotel stay). When the traveler makes payment to the retailing airline a message is sent to the supplier to prepare to deliver the service.

Each supplier then returns the delivery status of their services to the retailing airline as the traveler progresses through the journey, which are noted in the traveler's single order. This update may show the service has been fully, partially or not at all delivered.

The airline's Order Management System registers these updates, ensuring the status of the order is always up to date.

03.4 | Orchestrate the end-to-end journey with retailer : supplier workflow

BENEFITS OF JOURNEY ORCHESTRATION

• The retailer and all suppliers are connected in a single order, representing the traveler's journey.

• The retailer can maintain an up-to-date record of the services that have been delivered to the traveler supporting the retailer to better serve the traveler and accurately settle with suppliers.

• If the traveler makes a change to their order, perhaps to add another service or change the dates of a hotel stay, the Order Management System updates all suppliers when the traveler's order changes.

• Travelers no longer need to assume responsibility for connecting the dots and updating all suppliers when things change, greatly simplifying the travel experience.

• Orchestration plays a key role during service recovery scenarios, undertaking communication between the retailer and suppliers to return journey recovery options from which the traveler can choose.

A KEY PART OF THE JOURNEY ORCHESTRATION IS DELIVERY AND FULFILMENT TRACKING

Having a Delivery Management System undertaking the fulfilment tracking role as soon as an order is created is the approach taken by Amazon to great effect, allowing the retailer order to store the delivery status in detail, which in turn helps to improve the customer's experience.

It is only natural that for the "air" part of the journey, the Delivery Management System, replacing the DCS we have today, tracks the fulfilment of the service. It is also the intention to go beyond just departure, as done today, to also cover in-flight and arrival tracking.

Additionally, the removal of the DCS window means delivery systems, unlike DCSs, can be in constant communication with Order Management, making it feasible to constantly feedback to Order Management in real time.

Indeed, it is delivery that will track the status of the various "air" service order items a passenger has purchased and their delivery status e.g. a specific seat or a special meal.

This 'tracking' is about much more than simply what has happened at airport service points, and it is this capability that can provide a powerful end-to-end view to support retailing and servicing. Take the example of a seat in business class with a broken In-flight Entertainment System (IFE). Connectivity between the airline's maintenance and delivery systems means an upgrade to this seat can still be sold but at a discount which accounts for the broken IFE.

The delivery system can identify such triggers and events and update the order system accordingly.

When it comes to "beyond air", the delivery and fulfilment tracking of third-party suppliers, can be received directly in Order Management, or channeled through delivery, as suggested by some airlines in our Delivery Management Champions Group, to centralize the significant technical undertaking of fulfilment with all suppliers.

A benefit of this latter solution being that if delivery undertakes journey fulfilment tracking, it means that both journey delivery and service recovery will work based on an understanding of the complete end-to-end journey. This will prevent silos and ensure airlines can maximize the use of operational context to best optimize decisions.

Irrespective of the chosen approach, there is an urgent need to define orchestration communication standards at the industry level, including the future standards for today's methods like IATCI for interlining. Standardizing how offer systems interact with delivery to enable seamless retailing should also be a priority.

03.5 | Increase efficiency and reduce cost with a single view of flight operations

Future delivery systems will provide a single view of flight information, powering better decisions that improve efficiency and on-time-performance.

Airline agents and station managers will be able to see all the flights for a given day and the status of each flight displayed on a simple map with key information like on-time-performance, delay, outstanding regulatory checks and passenger transfer times.

With a single view of flight operations airline teams will be empowered with the real-time information they need to take the best possible operational decisions that improve efficiency and enhance the customer experience.

Perhaps more importantly, airlines will be able to harness this single view to automate key decisions. Whereas DCSs managed flight departure, delivery will also consider flight arrival.

For example, if the ETA of a flight is expected to be later, this information can be shared with the airport to ensure the aircraft is allocated to a stand that reduces transfer times for connecting passengers.

The airline can use machine learning to decide if boarding should be delayed for the departing flight so passengers can enjoy the airport rather than queuing at the gate. Agents are empowered with up-to-date information to provide high levels of service based on the latest operational picture.

Today when airports receive diverted flights, they have no way of understanding if there are any special service requests, e.g. a requirement for a wheelchair.

By harnessing the core capabilities of offer and order, which provide cast-iron certainty on each traveler's needs and entitlements, such special assistance information and much more will be available to agents within the delivery system, so the wheelchair can be in place and any turnaround delays avoided.

PREDICTIVE OPERATIONS ENABLED BY DATA AND MACHINE LEARNING

With this consolidated information delivery management systems can become a single point of reference for all airline operational data and how the operation is performing at a particular station. These data insights can be aggregated and displayed with the introduction of analytics and machine learning to predict potential issues ahead of time.

Such predictive information can be used to proactively mitigate issues or turned into actionable alerts that are shared with teams to pro-actively take care of impacted passengers, minimizing frustration. For example, if it is expected that a flight will have low passenger load factor then the airline will know it can accept additional cargo to maximize the value of the hold.

Airlines can also use these insights to understand stations and flights where they frequently encounter issues, and this data can be fed back to schedule planning so greater leeway can be included.

Flight-centric insights can also inform a real-time confidence score for each flight. If the confidence score reaches the desired threshold, then automated decisions can be taken, perhaps to allocate resources and inform passengers with a high degree of confidence about how the operational situation will unfold.

04

Empowering agents to provide a truly personal service

For many travelers that prefer self-service, dynamic information about their journey and pop-up offers intelligently sent to their device will remove the need for agent-led service altogether.

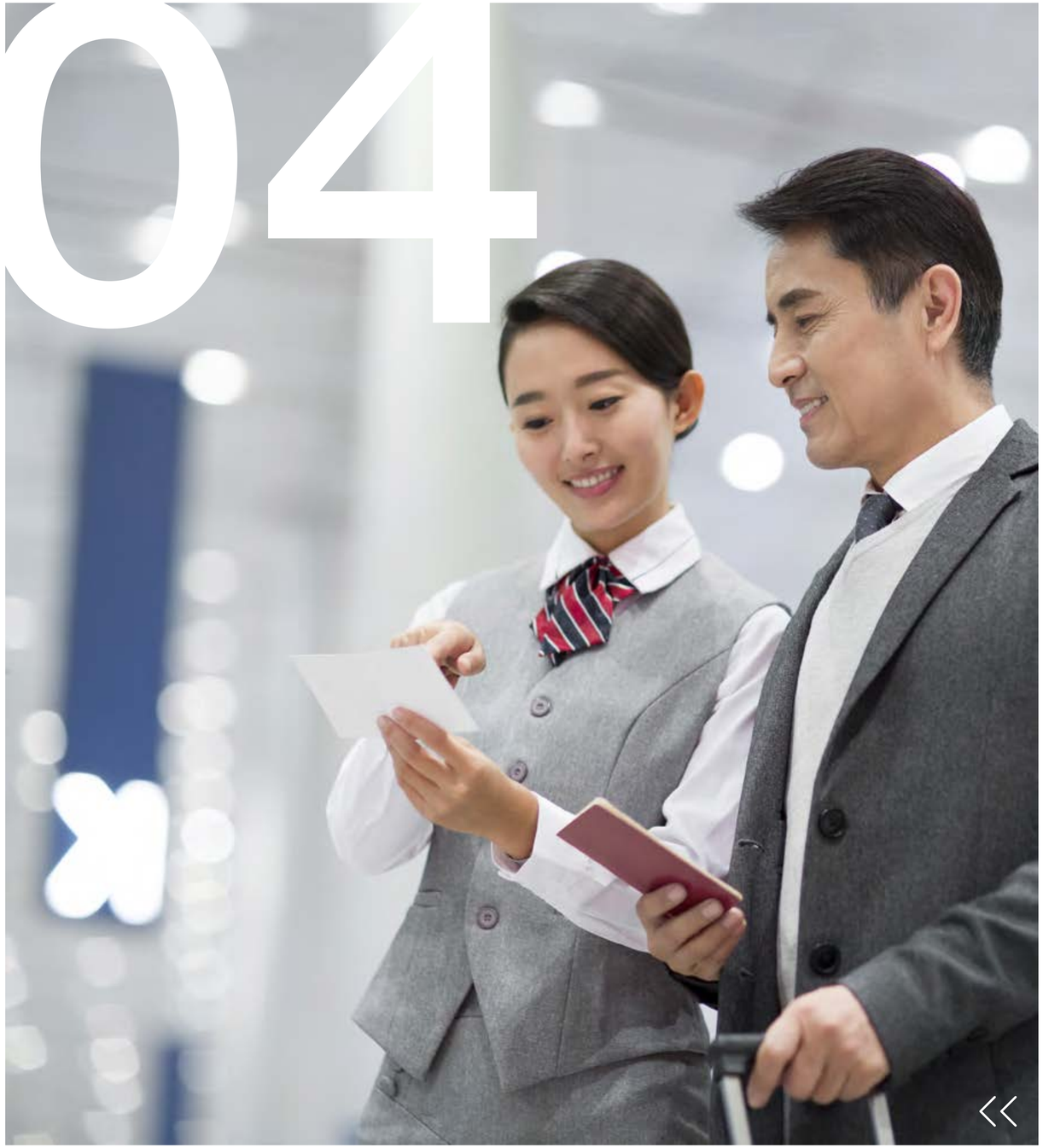
For passengers that choose agent-led service, airport customer service agents and flight attendants will evolve their role to become true customer service and sales advisors, helping airlines to maximize revenues and traveler satisfaction by providing consistent and accurate information.

With commercial logic accessible via the delivery system airlines can ensure that airport customer service agents present offers and service resolutions that are in-line with the airline's policies and commercial objectives. The need for agents to 'improvise' will be greatly reduced.

PROVIDE SERVICE EVERYWHERE

Rather than being tied to a fixed location like a check-in desk and focusing on issuing boarding passes, agents at the airport and flight attendants will be empowered with the traveler's complete journey context and the airline's commercial logic, free to roam the terminal or cabin, serving customers from a tablet or mobile, for example using capabilities like the Amadeus Airport Companion App.

This is enabled by a technology change that allows direct access to the airline's delivery system, reducing reliance on industry middleware like Common Use Passenger Processing System (CUPPS).

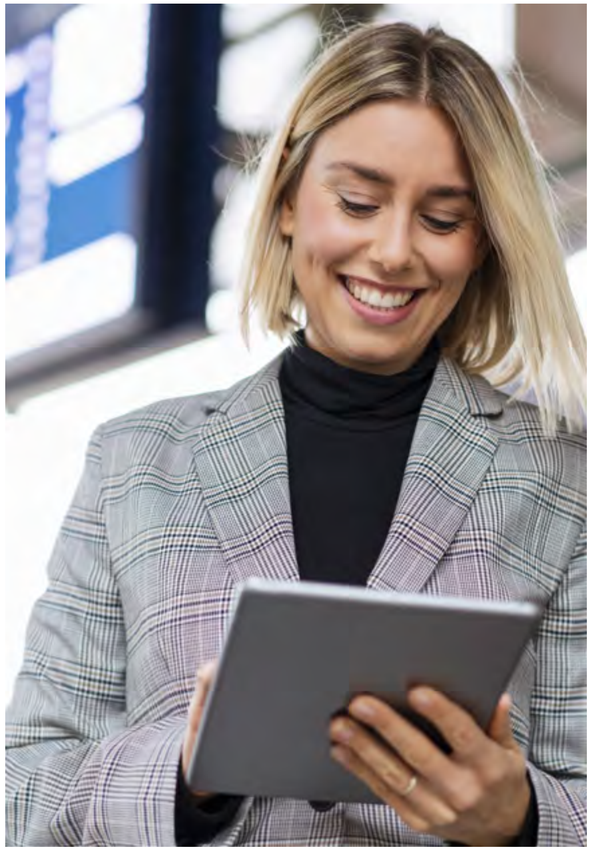


BUILD LOYALTY AND SATISFACTION WITH TRULY PERSONALIZED SERVICE

With easy access to the traveler's complete history, entitlements and journey itinerary, staff can tailor service to the needs of each passenger, guided by their airline's policies and commercial logic.

For example, if the delivery system shows the passenger has been disrupted three times during their last three journeys, the agent has the context to implement the airline's policy of offering complimentary lounge access or an upgrade.

Or, if an arriving flight is due to be delayed, automated offers and service updates can be offered directly via the airline's app for passengers that do not choose an agent-led service.



GROW REVENUE WITH POP-UP OFFERS

Agent-led service will become one of the main channels for airlines to grow revenue from airport retailing. The delivery system presents agents with highly personalized pop-up offers created by the airline's offer system. By presenting these offers to the traveler agents can become a powerful retailing channel, able to combine data-driven offers with personal service and advice.

For example, if a passenger arrives at the departing airport with a flight and hotel but no transfer, an agent could present an offer for a shuttle to the hotel.

IMPROVED COLLABORATION

New unified communication technology will ensure agents can better collaborate by removing silos. For example, agents at the ramp and gate can be connected with such unified communications tools to share information that helps everyone to be 'on the same page', especially during delay and cancellation scenarios.

CLOSING THE LOOP ON DELIVERY STATUS AND FEEDBACK TO FLIGHT OPERATIONS

For airlines to become true retailers they need a complete understanding of exactly which services have been successfully delivered and which haven't. Agents and flight attendants will feed this information back.

For example, if a passenger's seat is broken or a special meal isn't delivered, this will be logged in the passenger's order. This information can be used by the airline's service recovery system, perhaps to trigger an event like an email or offer of a complimentary service, ensuring the airline is fully traveler-centric.

It's important that airlines plan for this change by considering training programs that ensure agents are prepared for this exciting future.

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Seamless integration and interoperability

Underpinning airline business objectives to become retailers is an entirely new technical architecture that improves time-to-market and business performance through easier connectivity to an ecosystem of partners, suppliers and authorities.

Delivery systems sit at the heart of an airline, connecting its commercial and traveler understanding from the Offer Management System through the Order Management System, to touchpoints at the airport, in-flight and across the entire journey to enable personalized retailing.

They interface with the Order Management System, so the traveler's entitlements can be immediately understood across the journey while feeding back key information about the delivery status of those services. They are mission-critical systems that must be resilient and easily connected to other airlines' systems and government systems.

Through our work with airlines, we have identified several design principles for an entirely new architecture that enables new business opportunities.

OPEN

Airlines can improve every aspect of their commercial and operational performance with standard data models and easier access to data. Subject to the required consent and data privacy protection requirements, data feeds from delivery are fully open to be consumed by any application an airline chooses. For example, other airline systems, airport systems (e.g. baggage) and across the eco-system.

RESILIENT

Future delivery systems will be even more robust than today's DCSs. If cloud infrastructure suffers a problem in one region, another instance of the system will be immediately available from separate servers in an alternative region. Being able to serve passengers from any device means operations can continue, even if the airport's network suffers an outage.

AGILE

Airlines can improve time-to-market with an agile system that connects to partners more quickly, extending data domains, APIs and actions simply with modern technology. Partners can easily consume data streams from the airline to deliver a better overall journey experience.

SIMPLE

Airlines can improve time-to-market with simplified development.

Using the 'development studio' an airline's business analysts will be able to easily customize the delivery system using native language, with little to no coding required to build new commercial and operational capabilities.

SEAMLESS

Business efficiency is improved with systems that do not replicate data or create data silos, avoiding duplication and helping to deliver a seamless traveler and employee experience.

MODULAR

The industry has designed airline retailing to be modular and our technology is fully modular, providing the freedom for airlines to choose the modules they want.

In Amadeus' case, these capabilities of our airline retailing portfolio (Amadeus Nevio) are enabled by our Creation Platform, which provides an event-driven architecture and eases integration to the ecosystem.

Creating value with continuous optimization

Well integrated retailing systems will create a ‘circle of optimization’ as delivery updates the order system in real-time, which leads to follow-on benefits like better and earlier communication with the traveler, improved settlement and better decision-making.

Delivery and order will also work together as soon as an order is created to undertake key travel checks earlier in the journey. For example, using the ‘regulatory hub’ feature of delivery, an airline will know if a passenger requires a visa when the order is created, initiating a digital document process. Handling travel documents in advance reduces the hassle for the traveler and operational costs at the airport, something that cannot be achieved in isolation by the order system.

Similarly, as delivery will track the fulfilment of the passenger’s order new events can be created and picked-up by the airline’s offer system to trigger onward actions. For example, offering lounge access when a traveler arrives early for a flight or offering a transfer when the traveler’s luggage has been delivered.

This connectivity of systems based on modern technology with easily accessible data, events and APIs is the foundation for airlines to link what’s happening ‘on the ground’ to their retailing capabilities, supporting intelligent selling and servicing across the entire journey.

Airlines will also soon have the opportunity to continually optimize their operations by harnessing data feeds from delivery systems to learn and improve. Machine learning and analytics can be applied to these newly available data assets to optimize decisions and processes.

Take flight closure as an example. Such data insights will help airlines understand when they should wait for a late arriving passenger and when it's better to close the flight, or when it will be necessary for agents to check carry-on luggage into the hold.

VALUE BASED DATA SHARING USING STATE OF THE ART TECHNOLOGIES

Key to unlocking operational benefits is the ability for airlines and airports to more easily share data with one another. Today it takes many months for such agreements to be reached, and they remain rare across the industry.

Yet airlines need to know passenger processing times to inform decisions and airports would like to understand how many passengers are due to arrive.

Amadeus foresees easier and more automated data sharing capabilities using common platform technology and we expect that airlines and airports will see the value, developing closer relationships that facilitate greater sharing of data.

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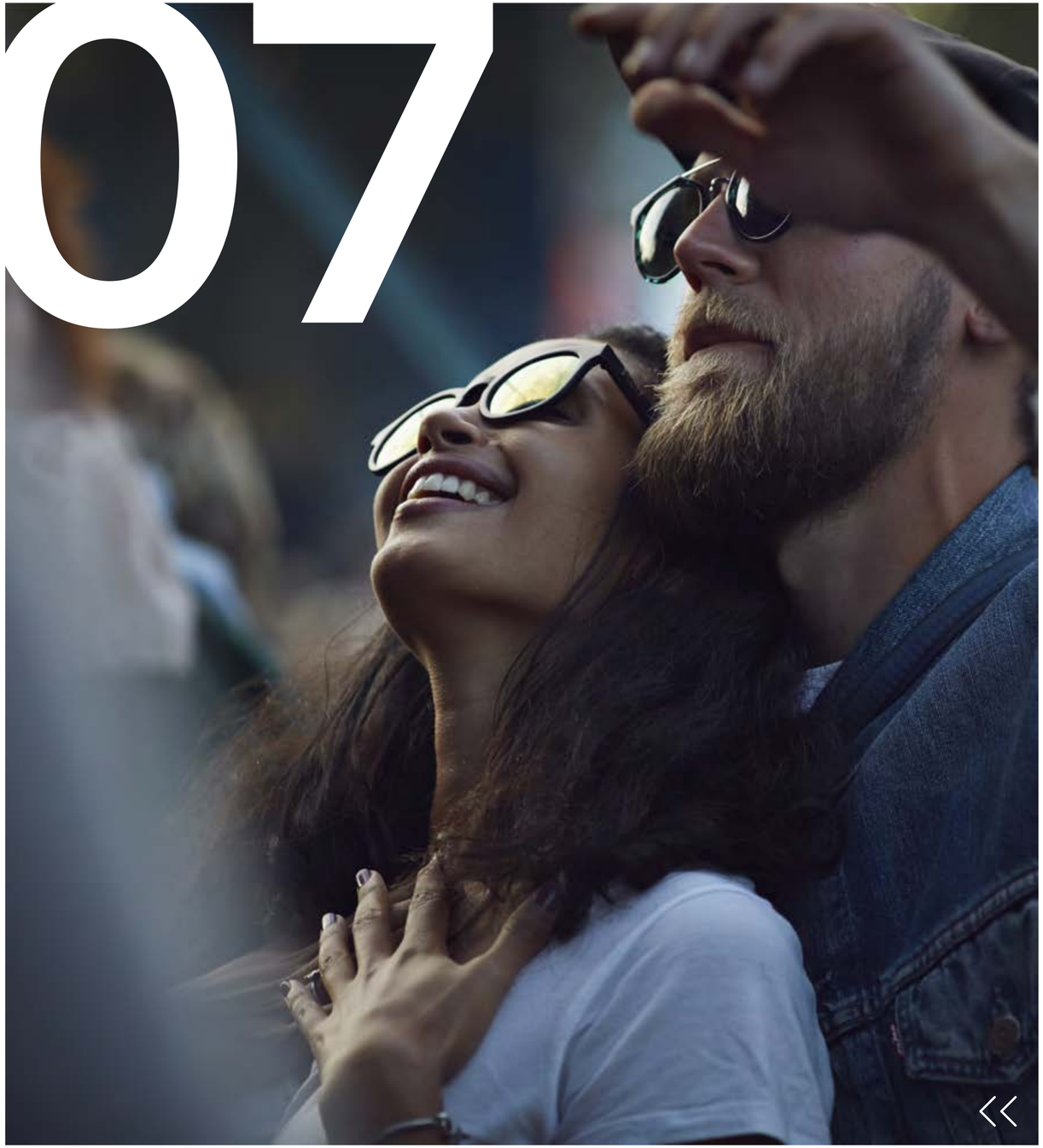

Delivery transforms service recovery

Airlines will be able to limit costs, protect revenues and build loyalty with faster and more complete service recovery, incorporating partner flight and multi-modal options that help airlines differentiate with a compelling recovery experience.

We believe service recovery must be closely linked to delivery to benefit from the ‘complete picture’ that delivery can provide, which can enhance the quality and speed of recovery options.

For example, thanks to delivery’s single view of flight operations service recovery will understand network impacts and the risk of delay and cancelations, derived from common datasets using predictive analytics and AI so teams can begin to plan sooner.

FAST, EFFICIENT AND PERSONALIZED SERVICE RECOVERY

Today, when a passenger is disrupted, they typically receive four separate notifications covering the reason for delay, the new flight option, food and beverage entitlements and finally accommodation options.

Existing industry processes like ticket re-issuance and limited synchronization between commercial and operational systems are the root cause of this issue.

This leads to a ‘window of uncertainty’ for the traveler. This period begins when disruption is announced and only closes when a satisfactory solution is presented. We know that passengers experience anxiety during this period and tend to seek advice, placing strain on call center and airport service teams.

Tomorrow airlines will be able to respond much more quickly during disruption, perhaps even being able to provide a single notification with all entitlements included. This becomes possible due to the removal of the DCS Window and the seamless communication between commercial and operational systems.

The passenger will be able to access their various choices and accept them using self-service within the airline’s app, with no need to see an agent or deal with paper vouchers. It will also be possible for travelers to understand which ancillary services can be protected during disruption and even third-party products too.

Following the retailing transformation, re-accommodation options will be much improved and further personalized. With connectivity between offer, order, delivery and service recovery systems the airline will understand if a traveler has a music concert booked the following day and can factor that into their re-accommodation.

IMPROVE OPERATIONAL DECISION-MAKING WITH COMPLETE OPTIMIZATION FOR SERVICE RECOVERY

Today passenger recovery options tend to be proposed only after the airline has first re-planned its fleet and considered maintenance, crew and airport capacity. In short, passenger requirements come at the bottom of the list due to silos within most airlines.

In the future, service recovery optimization will be linked to the airline’s operational systems so the disruption problem can be considered as a whole and optimized as a whole. These considerations will be balanced with revenue protection objectives to limit cost (e.g. ancillary services, hotel overnights and compensation).

Bringing this 360-degree view of all relevant data together means the best solution can be found to balance operational, cost and passenger needs.

IMPROVE THE CUSTOMER EXPERIENCE WITH SERVICE RECOVERY ACROSS PARTNER AIRLINES

This same logic can help to handle disruption across supplier airline partners too. Improved connectivity with the Retailer Supplier standard means the promise of the original offer can be best delivered even in disruption scenarios. With better sharing of information (e.g. availability and journey context) across partner airlines, supplier airlines will have the data they need to propose the most appropriate solution, in line with the traveler's order.

DELIGHT TRAVELERS WITH MULTI-MODAL SERVICE RECOVERY

With open systems and new standards, airlines will be able to build connections to other transport providers like rail, car and bus so they can be included in recovery options as standard.

This capability means more options for travelers and an increased likelihood they can fulfil the purpose of the trip, whether that's attending a conference or making it home in time for a loved one's birthday.

Getting more passengers to their destination promptly with multimodality will also reduce the amount of compensation airlines need to pay out, delivering a win-win for the traveler and the industry.

LIMIT COSTS WITH MORE INTELLIGENT ACCOMMODATION OPTIONS

Today airlines first consider how to get the traveler from A to B, with any overnight stay being a secondary consideration.

With easier connectivity it will be possible to supplement today's sources of hotel inventory with even greater choice and to factor this into recovery decision-making.

Take the example of a New York to Nice flight that is disrupted and will require an overnight stay to be offered at a transit airport / city. The airline has a choice to reroute via Munich or Frankfurt.

With an accurate view on hotel availability the optimizer would know it is Oktoberfest in Munich and there are limited hotel rooms at high prices, hence recovery options via Frankfurt can be proposed.

DIFFERENTIATION THROUGH SERVICE RECOVERY

With well-connected offer, order, journey delivery, and service recovery systems an airline will be able to propose various options to the traveler for adjusting each aspect of their end-to-end trip, including air, car, hotel and experiences.

When done well, recovery will present a chance to not only recover the passenger but to transform their journey into an actively positive experience.

For example, imagine if you were presented with a personalized, multi-modal, recovery option to your phone mid-flight, because the service recovery system already knew you were due to miss a connection.

Or if your bag was delayed, the airline alerting you on your phone mid-flight to confirm your address with a message that said: "we are sorry your bag will be delayed but don't worry, please proceed home and we will organize for it to be delivered asap."

Thanks to delivery's clear understanding of the bag's location there is no longer a need for the passenger to complete a form at the lost and found desk.

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Planning for a smooth transition

The transition to modern retailing will take many years and it's clear that airlines will need to support both existing and new industry standards and processes during this time.

Amadeus has designed its retailing portfolio (Amadeus Nevio) with 'adapters' that allow airlines to access the benefits of modern retailing while their existing PSS remains the system of record, ensuring continuity, resilience and interoperability.

Principles for a successful transition:

TAILORED PLAN FOR YOUR AIRLINE

There are a number of choices and trade-offs when devising such tailored plans.

For example, a smaller airline may decide to pursue benefits more quickly with a very fast ‘big bang’ cutover, whereas a larger and more complex airline may prefer to limit risk with a phased migration over a number of months.

BACKWARDS COMPATIBILITY

It’s crucial that airlines maintain backwards compatibility in their delivery processes.

If the passenger’s journey sees them travel to airports not yet able to handle journey codes, then the airline will need to ensure the entire journey can still be delivered, perhaps by also issuing a traditional boarding pass.

INCREMENTAL TRANSITION THAT UNLOCKS VALUE

Despite the gradual nature of the industry’s transition there are likely to be significant first-mover advantages for airlines that can demonstrate the passenger experience, commercial and operational benefits from the move to delivery.

Consider a transition plan that is incremental but focuses on unlocking early value where it is feasible.

TAKE A ‘FLIGHT-BY-FLIGHT' APPROACH

From a delivery perspective it is essential that each flight an airline operates runs on either a Delivery Management System or a Departure Control System, but not a mix of the two. Adapters mean that travelers booking travel using either traditional tickets and PNRs or offers and orders, can be accommodated irrespective of the system handling service delivery.

This will support airlines to reduce complexity by taking a ‘flight by flight’ approach to the transition.

Amadeus is investing so we are ready to work with airlines to ensure a smooth transition that limits risk, delivers value rapidly and ensures the retailing transformation is a success from day one.

Final thoughts

Delivery management benefits from, and enhances the value of, the single source of truth provided by the Order Management System.

It is at the heart of an airline's operations, helping to bring the retail transformation together with the need for efficient operations.

The right approach to delivery can enrich the value of the overall retailing system by ensuring that the journey experience lives up to the original promise made at offer creation.

With a circle of 'continuous optimization', well integrated offer, order and delivery systems will facilitate important retailing and simplification opportunities like pre-travel digital document checks, machine learning driven operational decision making and contextual offers made throughout the journey.

With detailed tracking of the delivery status of the different service items in the traveler's order, retailing airlines are well placed to ensure this context is available to their own and partner systems across the journey.

This service delivery tracking capability is key to ensuring the airport and journey experience are truly traveler-centric, especially during disruption scenarios.

With the move to delivery management airlines have a chance to re-think traditional processes and to harness a new, open and interoperable data foundation that will greatly simplify the experience of travel.

This simplification extends to the airport where there will be a reduced reliance on today's CUPPS standards and fewer fixed service points.

Instead, traveler's will increasingly administer their journey from their mobile devices, enabled by new technologies like biometrics.

When travelers do require an agent-led service it will be far more flexible and provided by roaming agents that have the traveler's unique journey context, and their airline's commercial logic, at their fingertips.

ABOUT OUR DELIVERY MANAGEMENT CHAMPIONS GROUP

Made up of airlines, ground handlers, airports and Amadeus, the group is working to define the design of an optimal Delivery Management System.

Through regular face-to-face sessions industry collaborators are considering the evolution of technology, standards and processes needed to achieve the best outcomes from the delivery management transformation.


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It’s how travel works better.