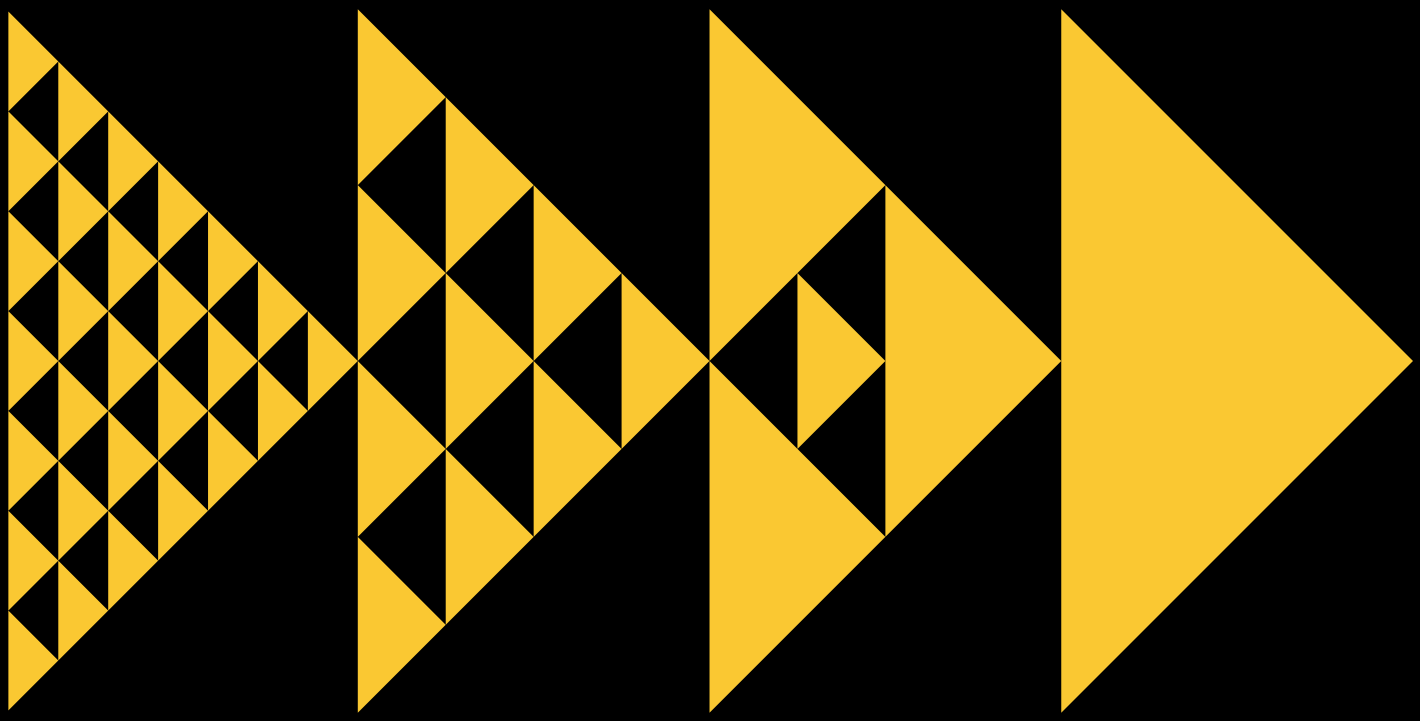
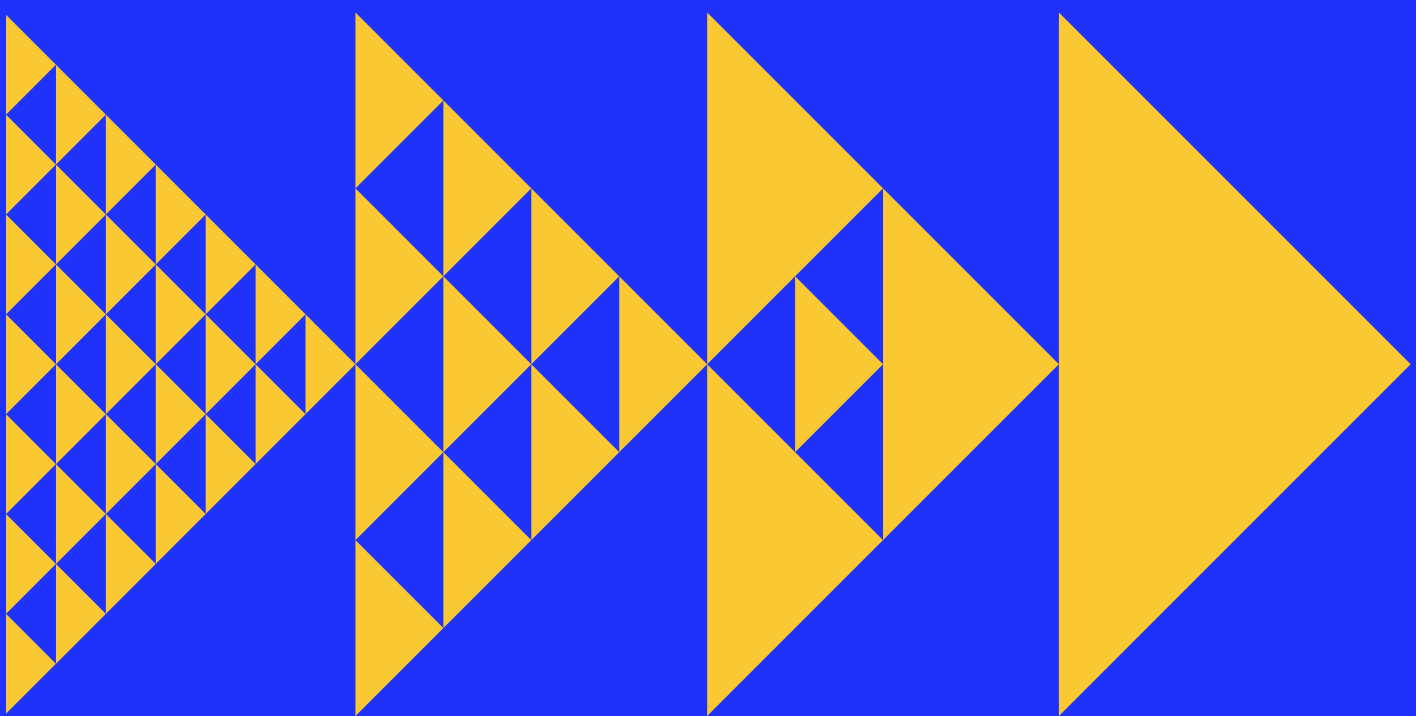
Airline Industry Retailing (AIR)
Think Tank



November 2020

IATA



FOREWORD

Aleksander Popovich

Senior Vice President,
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Resiliency will be in high demand going forward; and innovation and fresh thinking also will be required.

The COVID-19 pandemic is the single most devastating crisis to hit the airline industry since the beginning of commercial aviation. Recovery is not a matter of months but of years. IATA's most recent forecast does not see a return to 2019 levels of traffic before 2024. Thankfully, those employed by this industry are passionate about aviation and they are resilient in the face of disaster.

Resiliency will be in high demand going forward; and innovation and fresh thinking also will be required, as airlines work to rebuild networks and reassure travellers that flying is safe. The members of the 2020 AIR Think Tank took this into consideration when they made the decision to resume work after the activity was stopped for two months following the outbreak.

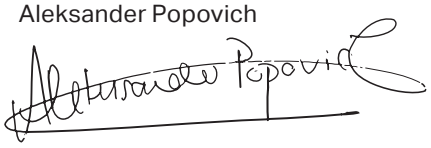
After that pause, most of the AIR Think Tank members decided that they wanted to continue working on the AIR Think Tank but with a new focus driven by the demands of the crisis. There was broad understanding that this pandemic will leave us with reduced resources – both human and financial. We need to learn to do more, and better, with less. We also need to learn from this crisis, and previous crises, so we are better prepared for the future.

Thus, the AIR Think Tank shifted the scope of its normal activity on airline retailing and distribution to focus on the industry restart, within the context of retailing. The three ideas developed over the course of 2020 will be elaborated in this document.

I would like to thank all of the AIR Think Tank members who gave generously of their time in this terrible crisis to develop this White Paper, and I hope that it will be shared across the industry and spark important conversations and industry initiatives.

Sincerely,

Aleksander Popovich



Executive Summary

The AIR Think was launched three years ago with the shared goal to transform the aviation industry retailing landscape. Aviation transformation leaders from airlines, technology providers and other partners and stakeholders meet to develop ideas and present their findings to the industry via this white paper. As a consequence of the pandemic, the AIR Think Tank decided to shift its thinking and brainstorming to focus on the restart. The team has worked on the following three ideas in 2020:

1 - Customer as the reference

2 - Emerging products and services

3 - Trust and resiliency

Although the ideas vary in their strategic depth, they each focus on the customer. Although the pandemic did shift the emphasis on safety and security, the airlines aim remains to continue to get closer to the customer.

The "Customer as the reference" idea aims to facilitate the move from transaction-centric to true customer-centric retailing processes, making it easier for the customer to travel. Next, the emerging products and services idea focuses on agility to propose improved services and better options for the customer. Finally, the trust and resiliency topic focus on transparency in information and making the customer more secure and ready to travel.

These ideas will be elaborated in this white paper. Unfortunately, the IATA AIR Symposium has been cancelled this year, and there will not be an opportunity to present the ideas on stage at the event. However, the white paper will be widely distributed and posted online. You are invited to review and send any comments to: **innovation@iata.org**

Overview of the content

AIR Overview

Background

Even though the pandemic has changed the short-term priorities of the industry, the world continues to go digital. In fact, digital is more important than ever. Customers expect personalized offers, real-time information and frictionless transactions. There is an opportunity to focus on building and transforming legacy processes into digital platforms and allowing the distribution and retail experience to be simple and interactive, offering customers a seamless, digital experience.

Paradoxically, the crisis has in fact accelerated the shift towards true airline retailing and therefore the journey toward an offers and orders environment supported by standards and activities such as NDC, ONE Order and Dynamic Offer Creation, etc. This is definitely a step in the right direction towards a future of airline retailing.

Definition of retailing in aviation

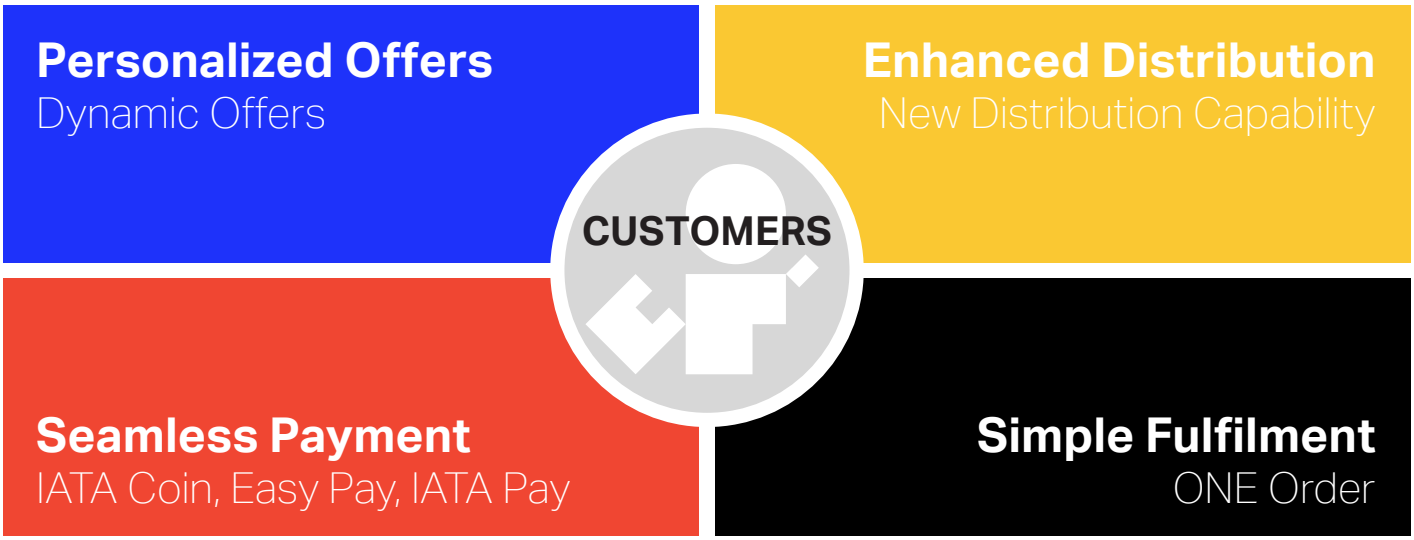
Retailing is the activity of distributing and selling goods or services to the final customer. In the specific case of the airline industry, it covers the shop, order and pay processes. It enables airlines to provide the right product or service to the customer, delivered through airlines' direct and indirect channels, at the right time, through an easy to, customer-centric and friendly process.

Successful retailing requires airlines to know and understand their customers better, to be able to provide personalized offers that meet their needs.

Scope

In 2015, IATA presented its vision to enable consumers to "shop- order-pay" for air products across all channels. Since then, IATA Members and partners have executed initiatives and communication aimed to lead the industry to become true retailers and compete with best in class retailers.

The scope includes four areas and a set of activities:



See **iata.org/air** for more information on the different activities.

AIR Activities and Events

The pandemic has largely disrupted the normal planned activities for 2020. Some activities and events were stopped or cancelled, while others were pivoted to focus on the restart. Below are examples:

IATA Business Travel Summit

Over the past few years, this summit has been the unique event bringing together decision makers from across the business travel value chain to discuss airline retailing, live NDC integrations and how to drive the industry forward. This year, the event was held virtually with a shift of focus on helping airlines to generate and retain cash, cutting costs and stimulating recovery and growth. There were insights on Covid-19 impact assessment, demand rebound tracking and discussions around the requirements to restart business travel. In addition, there were demonstrations of live NDC integrations featuring corporate buyers and airline partners sharing their latest NDC developments.

Hackathons

28+ hour events gathering developers from across the globe to work on innovative solutions enhancing airline retailing. The last AIR hackathon was held at the beginning of 2020 (pre-Covid-19), in Seattle and focused on solutions supporting passengers with reduced mobility.

Symposium

A major event addressing in depth the topics of retailing, distribution and payment from a customer perspective. The 2020 edition was cancelled due to the pandemic.

Think Tank

An ideation activity bringing together key stakeholders from across the industry. The Think Tank was put on hold during the peak of the pandemic, but quickly regained traction and pursued its activities in 2020.

Webinars

A series of workshops contributing to build the AIR innovation profile and ensure consistency across all AIR-related activities among key industry stakeholders. These webinars were pivoted to address restart themes like innovation in distribution and payment, innovation in ancillaries, travel assistance and distribution, etc.

AIR Tech Zone

A community portal for developers covering different industry initiatives and a one-stop-shop for accessing resources, documentation and implementation guidance.

AIR Think Tank

Vision

The AIR Think Tank aims to disrupt the way airlines do retailing and create ideas that will enable airlines to become true retailers. The aim is to lead the change for airlines through the creation and implementation of new ideas.

Scope

The AIR Think Tank focuses on airline retailing and distribution. In 2020, the scope remained on both retailing and distribution, within the context of the industry restart.

Members

The AIR Think Tank includes airlines, strategic partners and supporting organizations. While some participants had to drop out owing to the COVID-19 crisis, they were eager to continue and managed to stay involved through the year.

Structure

The AIR Think Tank kicks off each year in January. There are usually four face-to-face meetings that run until the AIR Symposium in October. The face-to-face meetings offer a unique opportunity for members to meet as a group and work within subgroups to develop the ideas.

The AIR Think Tank had its first face-to-face meeting in January 2020 in Abu Dhabi, hosted by Etihad and in partnership with Plug and Play. The local Plug and Play office sourced and provided start-ups for the initial ideation session, and this was followed by a team brainstorm.

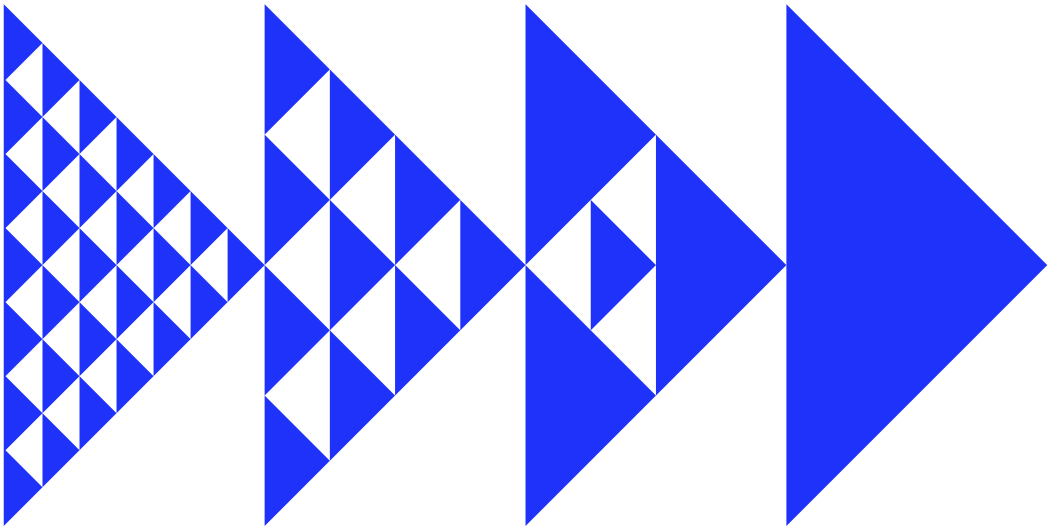
Soon after this meeting, the Covid-19 crisis hit. Planes were grounded and the AIR Think Tank was put on hold. A couple of months later, after most of the members decided to continue the 2020 AIR Think Tank, the team quickly adapted the scope and action plan. There was another ideation session where the three ideas were confirmed, and three subgroups were created. The subgroups met virtually throughout the last few months to further develop the ideas and create the white paper.

Output

The AIR Think Tank output is usually an annual industry white paper as well as the development of proof of concepts for each idea that are presented on stage at the AIR Symposium.

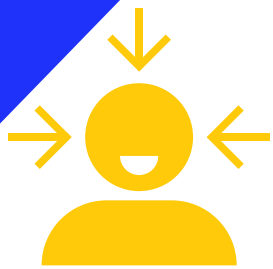
In 2020, the team has decided to develop this industry white paper. However, there will be no symposium and therefore the proof of concepts were not developed to be presented to the industry.

Instead the white paper will be distributed and communicated across the industry and the team will work with interested stakeholders to expand on these ideas where required.



2020 New Ideas

1 - Customer as the reference

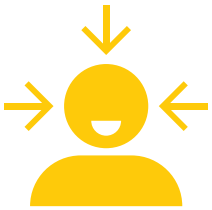


2 - Emerging products and services

3 - Trust and resiliency

2020 New Ideas

1 – Customer as the Reference



In 2019, the AIR Think Tank project TrulyMe envisaged a standard and a conceptual architecture that allows travelers to carry all travel information including personal data and preferences on a mobile device. Travelers could share their identity information and travel preferences with any travel distributor or travel supplier while remaining fully in charge of their personal data. If there was a change to their trip, updates and changes were pushed to access in the traveler's device.

This year, encouraged by the evolution of Verifiable Credentials and Decentralized Identifiers (DIDs) standards from the World Wide Web Consortium (W3C) and associated definition of an internet-scale digital trust architecture by the Trust Over IP Foundation, the team explored the identity and credentials aspects of the TrulyMe concept and the potential opportunities that could be pursued.

Vision statement

In the future, there should be no need for travelers to remember or write down a passenger name record (PNR) or an order number to claim a service. Rather, airlines, following the best practices from the retailing world, should recognize the customer first, using the credentials of the customer's choice and recognized by the airline. Also, customers should not be spammed by irrelevant recommendations that are based on second guessing when the customer can reveal their preference as part of the dialogue with an airline and receive relevant offerings.

Customer becomes "the reference" and the key to all interactions

Once the airline knows who the customer is, then the right service can be provided. Furthermore, there is no need for the airline to store all customer data. Information required at each touch point can be obtained from the credential carried by the customer. The ease of customer recognition also eliminates the problem of failing to identify a customer who may have multiple accounts with the airline and removes any confusion between customers bearing the exact same name.

This vision, also called "customer as the reference", promotes a true customer focus for the entirety of a customer journey all the way from shopping to consumption. Moreover, this focuses on joining up travel and distribution pieces into a complete end-to-end experience, with an aspiration to eventually deliver a truly seamless customer experience.

Current situation

Customers are often asked to share with airlines large volumes of personal information that should not be required for the airline to provide them with a service. Some customer information that has previously been provided, e.g., preferences), may be inaccurate or no longer valid. Also, even after this data is shared, airlines do not seem to have it on hand when the data is needed, and customers are often asked to provide the same information again and sometimes they are asked to provide redundant information.

For example:

- Why would an airline need to store the birthdate of my child to give them a child fare? Is it not enough to verify that my child is under the age of 12?
- Why would an airline need to store my passport number or its date of issuance? Should it not suffice for them to know that the information was given to the border control of the country of my arrival?
- Why did an airline call my emergency contact when my flight was overbooked, and I was not answering the phone? Could they have not sent me a message or asked me for a more appropriate contact to use?

Customers want service providers who can meet their needs, including offering products and services based on their provided preferences. There is no need for customers to keep typing desired itineraries and preferences on one site after another if they only want to see offers from airlines directly.

For retailers, the focus should be to offer relevant products and services at the right time to the right customer.

2020 New Ideas

1 – Customer as the Reference

Retailers want to differentiate products and personalize services. However, in the current environment, it is very difficult for the retailer to identify who from their current customers (whose records are kept in the customer relationship management (CRM) system) has placed an order or who is currently interacting with ground agents at an airport. In fact, data centers are full of disorganized data with double or triple accounts for the same customers.

Retailers must store, manage and protect large volumes of personal data for their customers such as their birthdates, passport numbers or contact details. A large part of this data is not necessary to conduct business, instead it is used to validate store and protect the data from cybercrime, fraud and unauthorized use and ultimately protect the privacy of their customers. This increases the cost and complexity of running the business because of the need to take extra precautions to safeguard all such data and manage their lifecycle.

With the Covid-19 crisis, governments are even requesting that retailers collect more of the personal data such as personal information required for contact tracing or indeed information about the health of passengers.

In summary, the current challenge for airlines is how to be customer-centric and unlock the full potential of retailing in a world where privacy regulations and cybercrime are realities and there is little cash available to invest or even continue to operate complex measures protecting data not needed to run the business all while the requirements on data collection are growing.

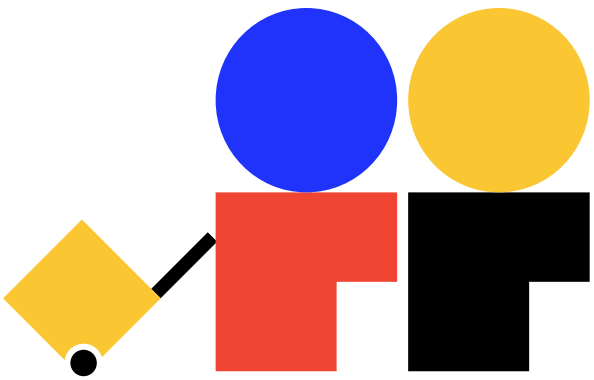
Vision description

In the not-too-distant-future, customers will rely on a personal digital concierge equipped with the latest artificial intelligence. An example of this concierge, called DigitalMe, will know customer preferences and plans and will interact with the systems of various services providers to seamlessly take the customer throughout the complete travel journey - from shopping to travel. Airline and other services providers systems will simply reference the customer's DigitalMe whenever they need to interact with the customer.

In this vision, a customer creates (or updates) a representation of themself on their DigitalMe based on what their needs are for their travel. This may include passport number, identification card, purchase order of duty-free items collectable at the arrival airport. The customer can decide or pre-select which credential to present at each touch point, as well as the level of information on the credential they want to share.

An airline (including interline connecting airline), hotel or service provider such as car rental company or local tour operator which the customer has made a booking with, will maintain a record of the customer in their system. This is referred to as the "customer digital twin".

The customer digital twin can be imagined as the record in airline or retailer systems corresponding to the customer and representing the data that is known about the customer and needs to be stored on the retailer side. At each touch point, the retailer will use the knowledge stored in the customer digital twin to recognize the customer and obtain advanced information needed to fulfil its service offering.



2020 New Ideas

1 – Customer as the Reference

Today, the digital twin will contain the data that airlines must store temporarily to do business as well as the data that the customer wants the airline to store. This may include references to multiple credentials used by the customer.

In the more technologically advanced future, the process may be as simple as storing a single reference allowing for secure and private communication with the customer's digital concierge - DigitalMe.

Additional service recommendations, like upsells and cross-sells can be performed through existing communication channels such as email, Facebook messenger or WeChat.

For scenarios where the customer has not yet decided on the service provider (e.g. brand agnostic) and is open to receiving targeted offerings based on his revealed preference, our vision assumes that the customer can publish their preference credential to multiple service providers in an open marketplace. Matching of preference demand and supply can be done through a machine-matching agent.

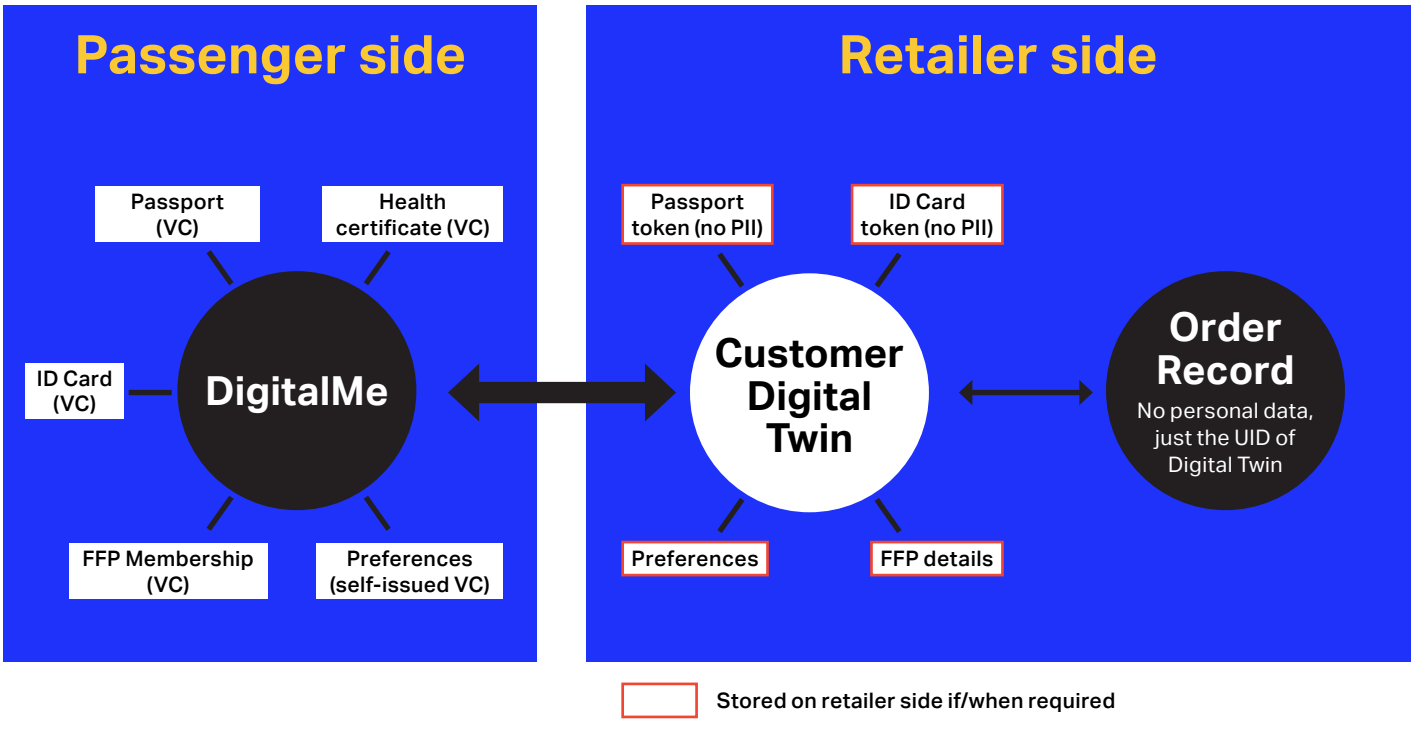
Recommendations

The future model of interaction with the customer is leveraged on a set of emerging concepts.

A central position is taken by the model of verifiable credentials. The customer's device will be enabled to become the central point to store it's data, from which different credentials could be shared depending on the situation.

For example:

- Preference credentials could be published to the digital marketplace to so that the customer can receive targeted offers
- The customer could share their full health credentials with a government which requires to know the details while making sure the airline only sees the fact that they hold the credential without showing any details.
- The customer could use a voucher in the form of a verifiable credential to collect a gift in an airport shop without having to show an identity document.



2020 New Ideas

1 – Customer as the Reference

Issuance of credentials

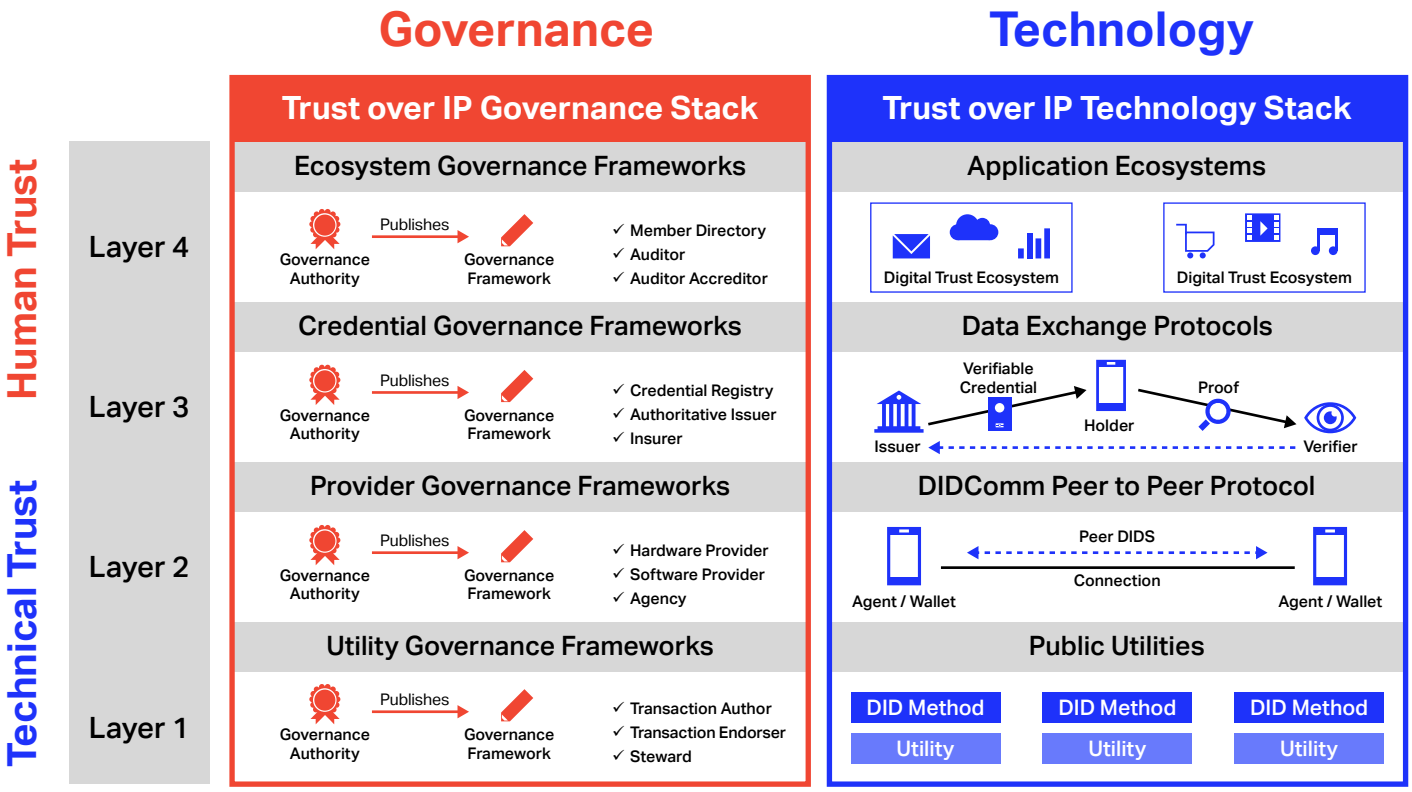
Issuance of credentials such as a health certificate, passport or biometric data follows a trust triangle consisting of the customer (holder), the issuer and the verifier who requests the information as depicted in the diagram below.

Once stored, these credentials can be selectively shared as subsets directly from a digital wallet by the customer via an appropriate protocol as a way that both the data and the transmission can be trusted. These can include "traditional" communication protocols such as Near Field Communication (NFC), Bluetooth Low Energy (BLE), web services or APIs as well as increasingly popular "shoestring" data sharing methods such as scanning a bar code displayed on a mobile device.

An orchestration service that informs the customer of relying parties (stakeholders such as airlines) and the information they require for timely and consented data exchange should follow the Decentralized Identity Communication Protocols using DIDs and associated Verifiable Claims (W3C standards). This allows the customer to selectively disclose credentials in a transaction known as proof request/credential offer to each relying party.

Publishing preference credentials

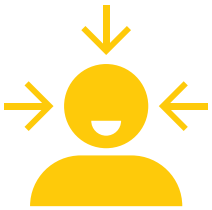
For scenarios where the customer wishes to reveal their travel preferences at a digital marketplace to multiple service providers with the intention to improve chances of receiving relevant product and service offerings, the customer can do so by self-publishing preference credentials.



Source: Trust over IP Foundation (2020) and Hyperledger Aries RFC 0289 (2019)

2020 New Ideas

1 – Customer as the Reference



Use case examples of DigitalMe

The key characteristics of DigitalMe, as listed below, create a new paradigm where the focus shifts away from having service providers store increasing amounts of information just in case some of the information may be needed, to minimizing the information that is needed to fulfil requirements of a transaction or service delivery. DigitalMe:

- Moves from recognizing the order to recognizing the customer
- Facilitates the building of a DigitalMe by the customer, where the customer is in control of their data
- Moves to a set-up where all key stakeholders can verify/authenticate the set of credentials (e.g., civil identity by the government, frequent flyer by the airline, payment by the payment provider, etc.) of the customer
- Pushes the responsibility of authentication of the individual and their credentials (is this a real passport? Is this passenger allowed to access to destination's country? Is this a fake credit card?) away from the airlines
- Moves from data maximization on the customer to a need-to-know basis, which minimizes operational costs and risks for data privacy breaches and data life cycle management
- Opens the opportunity to have a dialogue with the customer on their actual needs rather than second guessing of needs based on a semi-correct profile
- Enables interactions with value chain partners to transfer data via verifiable claims (e.g., is the customer age above 18 vs. show your passport)

There are many use cases where one can apply the use of DigitalMe. For illustrative purposes, three different use cases are presented below to describe how DigitalMe can be used as a form of credential (such as a passport or health certificate), as an effective way to pass information to single or multiple service providers for them to fulfil their service obligations, and as a means to publish preference credentials to a digital marketplace.

1. DigitalMe used as a health certificate

Currently, as the industry is working towards restarting travel while meeting the safety requirements of many countries, the ability to allow the customer to present digital health credentials that will be accepted by the destination border is a vital requisite. The handling of a customer's medical data is highly sensitive and should be processed with the highest level of privacy and data security.

A customer takes a polymerise chain reaction (PCR) test prior to departure and the medical center performing the test will issue a digital health certificate which could then be presented as a health credential upon arrival at their destination and verified by the border quarantine without interference of the airline

2. DigitalMe used in passing information to service providers (See the example below on use case/prototype)

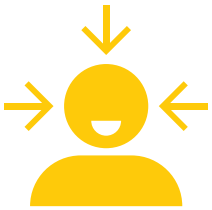
3. DigitalMe used in publishing preference credential

A customer may have specific requirements and preferences but does not know which service provider could meet those requirements. The customer therefore publishes a list of criteria using their self-declared credential to a digital marketplace without revealing information they do not want to share. A service provider in the marketplace can meet all the requirements and makes its offering to the customer.

In this scenario, the service provider, by having access to information of the customer's revealed preference, does not need to second guess what the customer wants or is willing to pay. This removes the kind of inefficiencies we see today in customers constantly receiving irrelevant service recommendations.

2020 New Ideas

1 – Customer as the Reference



Use cases/prototype

This use case involves the customer asserting their identity credentials when placing the order and asserting payment credentials.

1. The customer publishes requirements for a journey they want to take from Tokyo to Groningen and receives a set of offers from travel retailers that match those preferences. The customer has been clear around sharing a minimum set of information in terms of those requirements and has not shared any details related to their identity.

2. The customer decides to purchase one of the offers provided by one of the travel retailers. In this case the retailer is an airline who can offer their services to transport the customer from Tokyo to Amsterdam and then transfer them onto a rail supplier who will take them from Amsterdam to Groningen. When placing this order, the customer consents to a minimum set of identity credentials being shared from the airline retailer to the rail supplier. This full journey is then linked to the customer's DigitalMe.

3. The customer then chooses to shop and order car hire for their arrival in Groningen. A different set of identity credentials is shared with the car hire company including an assertion of driving license details. Again, the car hire is linked to the customer's DigitalMe. The customer also chooses to share the details of the rail journey with the car hire company through their DigitalMe. It should be noted that they do not share details of their air travel.

In this scenario the air and rail suppliers both know about the other parts of the single order placed by the customer. This means that if there is a flight delay then the rail supplier may have the ability to react to this and rebook the customer's onward rail journey. Similarly, the car hire supplier will be able to react to the change in rail order and rearrange the car collection time. However, the car hire supplier has no idea that the real reason for needing to make this change was the original flight delay – that information has not been shared with them.

Benefits

The introduction of the customer as the reference offers the following key benefits:

1. The first and foremost benefit is the customer-centricity. For airlines, this means the ability to personalize and reduce the inefficiency of second guessing the customer's needs. For customers, the benefits lie in the removal of the hassle to constantly share personal data and the opportunity to get more relevant options.

2. A customer-centric approach also allows airlines to proactively manage change during disruptions. The customer as the reference means that the airline always has the customer contact details necessary to reach out and engage directly with the customer to identify suitable alternative options as quickly and efficiently as possible.

3. It enables a true customer focus for the entirety of a customer journey all the way from shopping to travel, joining up travel and distribution pieces into an end-to-end experience.

4. Another benefit for airlines is the removal of costs, complexity and risks associated with managing personal data of customers and, with it, increased trust by customers because the risk of personal data exposure is minimized.

5. An opportunity for customers and airlines alike to unlock further benefits. For example, the same principles can be used by customers to share health data with government authorities.

Next steps

Building on the above described ideas, the team aims to work towards having a proof of concept with interested parties using one or two relatively simple but value-adding use case(s) in the area of issuing and presenting health credentials, which currently could help facilitate and speed up the reopening of international borders. Working on implementing a proof of concept will also enable the team to identify in detail the components needed for each governance and technology layer such as communication protocols and network environments.

2020 New Ideas

2 – Emerging Products and Services

Vision

The emerging products and services topic present a framework and a drive for accompanying standards that aim to make it easier for airlines and providers of third-party products and services to work together. Furthermore, the aim is to collaborate and deliver an enhanced level of customer experience without the immediate need for a deep level of relationship and integration.

This is very much a pragmatic approach that aims to support the industry recovery from COVID-19 and enabling all parties to achieve more with less. This is not the normal Think Tank approach where we would be focused on longer-term transformation. It is intentionally an approach where we are focusing on benefits for now which are realistic for airlines to deliver in the coming months rather than years.

The approach outlined intends to become a component to achieving a fully connected and adaptive end-to-end customer journey in the future.

Current Situation

As a result of sophisticated legacy infrastructure and multiplicity of processes, the integration and onboarding of new products and services into the airline ecosystem is challenging and complex. This is true whether for products and services created by the airlines themselves or sourced from a third-party supplier. In this second case, this also leads to complexity for the third party and results in a very slow speed to market and high integration costs. As the industry looks to recover from the devastating effects of COVID-19 this idea addresses an innovative approach to easing the burden of onboarding third party products and services, minimizing the impact on the underlying airline systems estate, improving speed to market and ultimately driving a better proposition for the end customer.

The general aim is to demonstrate that a stream of events published by an airline and subscribed to by any approved supplier will ease integration, drive innovation, and help to deliver a better service to the end customer.

To facilitate this, it is assumed that the customer flight details have been shared with the supplier. This will either be because the customer has entered them as part of the purchase process, or the airline has shared them through the hand-off to the supplier or as part of the deeper integration.

N.B. This sharing of information is deemed to be consciously authorized by the customer, ideally thanks to a customer centric data privacy process (e.g. AIR think tank 2019 project Truly Me and this year's "Customer as the reference" topic) however it is acknowledged that this may not be possible in the short-term so more traditional approaches may be followed.

Two levels of integration are possible:

1. Purchase is made through a hand-off to the provider site, possibly white labelled, where the airline doesn't track any details of the customers additional purchase.

2. Purchase is fully integrated into the airline shopping flow and a record of the customers additional purchase is maintained with the airline order, delivery is tracked etc.

The latter involves a substantial amount of work on the airline side, including the implementation of an order management system. Considering the highest priority for the industry post-crisis is on gaining speed to market and reducing costs, the focus for this example is on the potential that it can be achieved through the first method.

2020 New Ideas

2 – Emerging Products and Services

Recommendations

Example - Ground transportation on arrival

The example used to illustrate this approach is the journey for customers who have booked their travel, including a checked bag, through an airline.com and added ground transportation using a link to a third-party provider. Unfortunately, their flight arrives late, and their bags are also delayed in being delivered to the baggage hall. As a result, this impacts the ground transportation service.

1. The customer is shown on an airline.com order confirmation page, flight with bag included, with a link to a third-party site for booking an airport pickup.

2. The customer clicks on the link, shown on the site as having selected a pick-up for arrival and shares details of their flight, date, hold baggage etc. (could be passed through and shown as pre-entered, or be entered by the customer).

3. The customer is on the plane and there is an announcement of a 30-minute delay.

EVENT 1

Airline publishes aircraft delay event - transportation provider consumes event

4. The customer lands late, switches on their phone and receives a message notifying them that their pickup has been rescheduled.

5. There is another delay in the baggage hall of a further 15 minutes. Another notification is sent to the customer from the third party rescheduling their pickup again.

EVENT 2

Airline publishes baggage delay event - transportation provider consumes event

6. The message shows the car is arriving within two minutes.

7. The customer collects their bags, leaves the baggage hall, exits the airport and goes straight into waiting car.

2020 New Ideas

2 – Emerging Products and Services

Architecture perspective - The event-driven architecture

Applications are becoming more and more interconnected via APIs and interconnected systems should be talking to each other. The traditional request-response API models do not support much of this interconnected communication. That's where an event-driven API architecture delivers value.

An event-driven architecture establishes an event that can be consumed and reacted to. An event is essentially any significant change from one state to another. Any such state can be reacted to internally, externally or can be used to generate another event (Figure 1 below).

Hence, the event-driven architecture is a three-step process where the producer writes the event to an event bus that is listened to by the consumer. An event only carries the information required for the consumer to be able to perform its job.

In this idea, the producer is the airline involved and the consumer is the third-party provider of products and services. The airline has full control over who can or cannot subscribe to the events that they publish.

To summarize:

- The event-driven architecture paradigm promotes production, detection, consumption of, and reaction to events
- The event-driven architecture is a design pattern in which application data is defined as a stream of events
- Simply put, the event is a significant change in state, which is triggered when a user or a system takes an action.

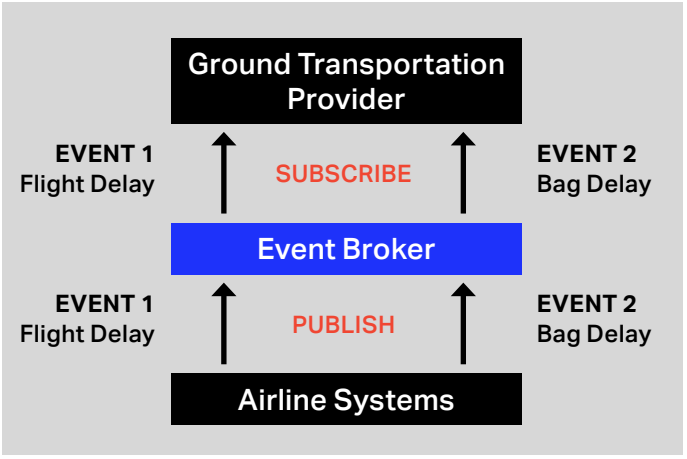
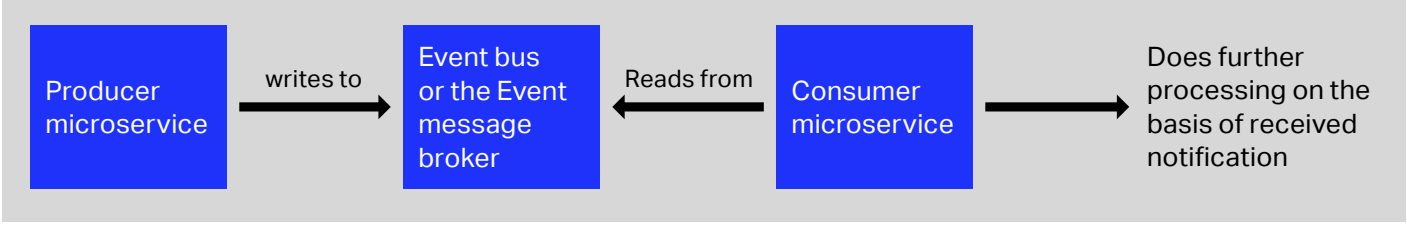


Figure 1



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As a further example (see Figure 2), if we take the journey of the customer as an example where there are series of events and an action/notification flow based on the event:

1. When a customer has booked travel with their family and added three bags, the state can change to "potential customer for a car booking" and can make an API call to book the cab through the car booking adaptor and route the booking to ac car service like Uber.

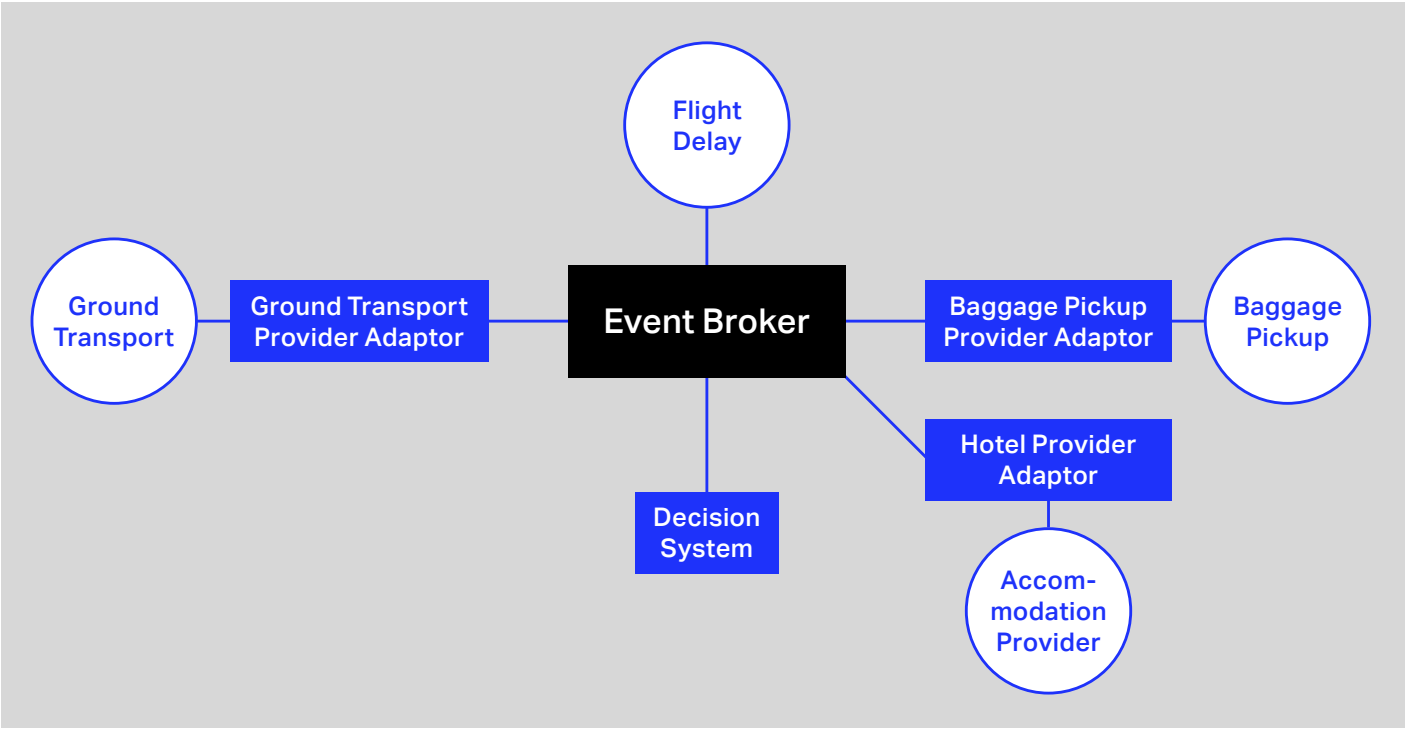
2. When the aircraft lands at the airport the state can change to "landed" and can now make a call to the "bag pickup adaptor"

In summary, every event may trigger one or more than one options in response.

How is the event-driven architecture different from the request-response model?

Question	Request-driven	Event-driven
Why is an action being taken?	As a response to a specific request	Triggered by a fact that a situation has been detected or has happened
When is the action being taken?	When the request is being processed	Determined according to the context of the situation
What happens when request/event occurs?	A response is always produced	The event can be ignored, increment the state, trigger an internal derived event, or trigger a situation

Figure 2



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Benefits

This flexible framework clearly offers significant benefits to both airlines and third-party providers.

For airlines:

- An improved offering for the customer
- An easy way to work with new providers of products and services with a faster speed to market
- A simple model for event publishing that is less invasive on the core airline IT estate
- The implementation of a building block that will drive even more benefits in the future when deeper, API-based integration is added alongside it

For third party providers:

- A simple way to achieve a deeper relationship with partner airlines
- Simple and repeatable integration of events from multiple sources
- An improved offering for the customer

When implemented, this will succeed in delivering a better end-to-end experience for the customer. While it may not be perfect, this level of collaboration between airlines and third& parties is certainly something that customers should expect.

In addition to this, it is important to highlight over specific points around the event-driven architecture itself.

Advantages of the event-driven architecture:

1. Adding new events and processes is very easy in the event-driven architecture. This means that new ancillary products can be scaled with ease.
2. Changes or moves to any event can be quickly roll-backed in the event-driven architecture. Doing so proves helpful in case any issue occurs.
3. Event-driven architecture also gives transactional guarantee, i.e. there is a notification of every successful transaction that occurs.
4. The architecture is versatile and easily replaceable.
5. The architecture is highly responsive. Instead of waiting for issues to occur, they can be easily detected in advance – thus ensuring that the app keeps working.

Possible impediments to adopting an event-driven architecture:

1. Some airlines, especially full-service carriers, have made “seamlessness” of customer service their goal for years. Moving to less integrated services based on an event-driven architecture might be viewed as a temporary step back in this respect. It is important to convince customer experience executives to balance their ambitions towards seamlessness against a real ability to provide innovative new products and services. As this smart way forward certainly needs some explanations, this paper should help to stimulate conversations.

2. Disruption policies and processes between partners should be determined “by default”. Air-to-air disruptions are well documented and standardized by IATA. Non-air disruptions must be studied at least for most frequent and basic situations in order to properly manage customer expectations. Event-driven architecture does not solve alone possible questions on “who is responsible for the customer” at the interface of two services. Therefore the “handover” of the customer still must be clarified at key moments of their journey.

Next steps

Some of the industry infrastructure, including standards to support the above use cases are already in place for several industry domains. For instance. the pub/sub model is currently being used in baggage operations and the aviation information data exchange (AIDX). Customer-facing APIs for flight information are also published. Therefore, the approach outlined in this paper strengthens the case for an event-driven architecture model and highlights a natural convergence with existing IATA messaging standards, underpinned by the IATA Airline Industry Data Model (AIDM). It is in fact an area of interest for the IATA Architecture and Technology Strategy Board as an additional capability in the armoury of the industry. Initial thoughts on this focus on the idea as events as the triggers for automation. The clear next steps will be to test specific scenarios end-to-end with live pilot and improving/adding industry standards as needed and engage with industry standards development groups to enhance industry standards to support the event-driven architecture framework.

2020 New Ideas

3 – Trust and Resiliency

Vision Statement

Rebuild customer trust by providing transparency, automation, and ability to quickly adapt to evolving customer needs due to crisis.

Vision Description

The industry continues to focus on the industry restart, post covid-19. One of the most important challenges is on how to regain and maintain customer trust. Although this is the worst crisis to hit aviation, there have been other crises that we must learn from and inevitably there will be future crises we must prepare for. By learning from the past and the current crises we can focus on regaining customer trust.

The focus is on maintaining the trust and developing a robust solution that include steps the industry can take to be more resilient now and in the future.

Furthermore, the vision is to provide airlines with the means to regain customers trust and encourage them to travel again, without destroying value.

For an airline, it is key to find the right balance between trust /flexibility vs. revenue steering. This can be achieved through the provision of flexibility in choice and transparency, through further unbundling travel flexibility, while keeping a solid revenue optimization model.

The AIR Think Tank Trust Subgroup delved into the long-term implications, in 2021 and beyond, to focus on continuing to build customer trust in travel in a responsible, viable manner. This required the team to focus on:

- Enabling greater choice and transparency in retail
- Addressing needs emerging from crises through value-added products and services
- Ensuring this does not worsen the already harsh economic environment of post-COVID-19 recovery

The five core concepts that address these objectives include:

1. Ensure health safety measures are executed and communicated dynamically to customers before, during, and after travel
2. Customer preference, data-driven travel retail, including offers for “plan B” solutions
3. Unbundling travel flexibility
4. Integration with new products and services, with the right balance of seamlessness vs. easy add-on
5. Airline platform flexibility to switch to new modes of operation based on real-time travel restriction information

The objective is to continue to build on IATA’s current scope of standardization e.g. NDC, ONE Order, product definition, partner integration as well as products such as TIMATIC to deliver a win-win for customers and travel retailers – promote well-informed, responsible travel retail practices and create a pathway for economically viable growth of the travel industry.

Current situation

Covid-19 has grounded most planes and the negative revenue situation has led to inversion of margins, and a catastrophic drain on operating cash reserves. Travel providers are left behind with footing the bill for increasing regulations, requirements, restrictions and customer expectations – leading to a global collapse of the economic viability of travel.

Rapidly changing regulations, requirements and restrictions are hard to keep up with – without any central clearing house for such information.

Customers are left with trying to decipher fare rules for flexibility, change fees, refundability options, and are increasingly reaching out to credit card and travel insurance providers for relief.

Often, government aid to the industry has been contingent on a range of requirements that have left airlines with additional constraints in addressing fixed costs.

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3 – Trust and Resiliency

Recommendations

1. **Ensure health safety measures are executed and communicated dynamically to customers before, during, after travel**

Safety and security have become two of the top factors and drivers for customers. They want to feel confident:

- With their purchase: trust that their purchase is safe, and they will get what they paid for (flight or refund and/or credit).
- During the flight: trust that the airline is putting health and safety first and enforcing all health measures.
- At the destination: trust that they will not be stranded if borders close or flights are cancelled.

Although airlines can manage most of the trust aspects, the most important underlying trust aspect is perhaps related to the information the customer accesses before the customer makes the purchase.

Using this current pandemic as an example, countries are changing information on who can enter their borders and quarantine rules on an extremely frequent basis. There is little to no coordination between countries and the information for customers is overwhelming and messy. Similarly, governments are not collecting this data in a coordinated way.

Helping governments to identify and implement globally scalable solutions to collect data needed to prevent the transmission of COVID-19 and allow opening of the borders should be a priority for IATA.

Without a global approach, it has been already demonstrated, governments will be collecting the data on an individual basis. Increasingly fragmented digitalization of passenger data collection by the governments will be a heavy impediment for the restart. Beyond slowing down of the border opening, the traveller's confusion and risks to personal data privacy, proliferation of standalone government solutions will directly impact the airlines in terms of passenger processing and costs.

The IATA Digital Transformation Advisory Council (DTAC) developed the below Passenger Data Principles and recommended to develop industry guidelines of what a traveller-centric industry-acceptable digital solution should look like:

- A solution to declaring passenger data needs to be interoperable, consistent, scalable, affordable and simple to implement
- Airlines should not be involved in the collection of data but to ease automation, passenger experience and airlines' operation, data elements should be harmonized and collection process as well.
- Solutions must not rely on airlines collecting or storing health or travel history information.
- Any declaration must be done in advance of travel to avoid burdensome processes at airports.
- Carriers cannot be held liable for any penalties related to inadmissibility.

Passengers need to feel assured before travelling. It is essential that airlines build this trust back with the passenger as soon as possible. IATA is advocating on behalf of the industry to provide the information the passenger needs to make an informed and trusted decision as early as possible. For example, IATA is advocating on behalf of the International Civil Aviation Organization (ICAO) Takeoff guidance, which outlines layers of measures to mitigate the risk of COVID-19 transmission during air travel and the risk of importation of COVID-19 via air travel. More information on this can be found on iata.org.

2. **Customer preference, data driven travel retail, optimized offer nimbly integrating new criteria of choice resulting from crisis**

What's behind the concept of "optimizing an airline offer"?

Airlines are in possession of assets: these are all the product "attributes" associated with a trip, which are produced or bought by an airline for their customers. Examples today include i.e.: one baggage in hold, one lounge access, Wi-Fi connection, access to business class cabin, etc.

Airlines are making money by monetizing these customer attributes. It can be done in various ways:

- Include the attribute within a bundle (also designated as "branded fares" in the industry, from a retailer point of view it is a "package of services").
- Selling the attribute as a stand-alone product (i.e., a-la-carte paid option).
- Include the attribute in the basic product (e.g., coffee on board in economy class on a full-service carrier) in order to differentiate from competition.

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- Include the product as a loyalty "perk "(e.g., one free hold baggage for higher-tiered customers).

- The optimal recipe is specific to each airline and includes the balance between branded fares, upsell combination, a-la-carte range and model and flexibility. Also, the way/ ability to correctly display the offer on all channels plays a big role in the take-rate.

Offer optimization consists of proposing the right offer to the right customer at the right moment in their journey, maximizing take-rate, margin and customer satisfaction. This idea aims to smartly include the consequences of a crisis within the offer of airlines.

What is the situation now?

Even before the COVID-19 crisis, airlines, solution providers and distribution stakeholders had identified quite a few questions and bottlenecks, and defined the respective solutions:

- How can we follow and enrich search and booking paths for indirect distribution? The solution is ongoing thanks to NDC.
- The vast majority of customers are not identified during their search. The optimal balance is to be found between standard packages (branded fares) vs. micro segmentation (based on anonymous search behaviour) vs. full personalization (based on full customer identification). The solutions are being discussed and work is in progress related to the IATA Customer as a Reference (see topic in this White Paper)
- NDC implementation has proven that the theoretical infinite range of offers can bump into the wall of look/ book ratio, leading to heavy computing and unacceptable response times. Various optimized solutions have been identified but not yet fully implemented (e.g. IATA's project Robot). The new solutions proposed here must stay realistic in terms of volumes of possibilities and response times.

What is new since the COVID-19 crisis?

With the COVID-19 crisis, a new normal is expected, where attracting customers and reassuring them plays a much bigger role than before. Therefore, airlines which want to optimize offers must consider:

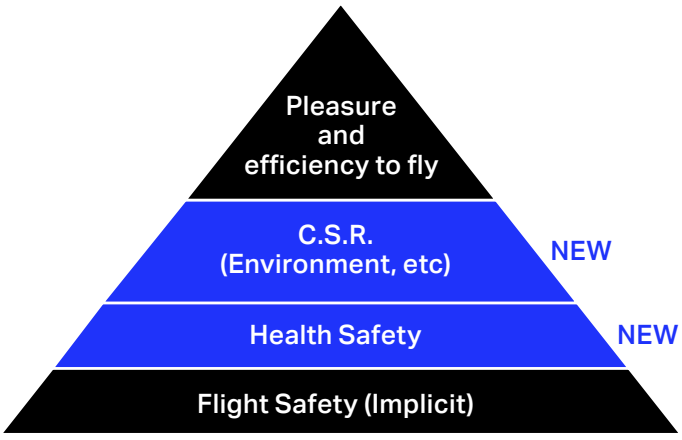
- Include new expectations into the rationale of optimization (see next §)
- While origin / destination was the basic first criteria until now, customer now look broadly to destinations matching their criteria
- Time of booking before travel is shorter than ever

While other IATA working groups are addressing these topics, we already witness a deep change in the hierarchy of customer's preferences.

Above implicit flight safety, which seldom plays an explicit role (a notable possible exception being currently how to accompany 737MAX return to operations), **new expectations have emerged** very strongly within the hierarchy of needs: health measures and environmental responsibility.

New reassurance information should be included in the booking flow or during the inspiration phase, for example:

- Health safety: air filtering onboard, capacity capping onboard, personal protection equipment provided for free or for sale, COVID-19 testing, fly-back insurance, remote medical assistance, etc.
- CSR: concepts like "carbon footprint value", percentage of sustainable aviation fuel, carbon compensation, percentage of recycling for food and garbage, "environment as a new currency", etc.



Traveler's needs have evolved into a new hierachy

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Potential prototype

As an example, a potential prototype could be a user experience design to define an ideal customer journey in this new world.

The proposed prototype can include:

- Customer indicates must-have and nice-to-have preferences
  - > Must-have: Travel provider preferences (e.g. alliance, carrier, loyalty programs, etc)
  - > Safety measures (enforcement of clearing other passengers before departure, pre-flight cleaning, HEPA filtration)
  - > Seating preferences including enhanced distancing on board when load factor permits, (window, aisle, middle, adjacent seat free, row to yourself)
  - > Service preferences (contactless payments, touchless bag drop, etc.)
- Customer manages their profile
  - > Passport, visas
  - > Corporate identifiers
- Customer searches for where they could go (map search) or , customer searches for origin and destination/date
  - > Flight search result reflects preferences
    - Only includes results meeting must-have criteria
    - Shows number of flights restricted by must-have criteria
    - Filters manage
      - nice-to-have criteria
      - flexibility and re-accommodation options
      - quarantine, pre-trip medical requirements

Ability to easily plug-in new services and information sources in a short time-to-market manner is now key.

A new "event-driven architecture" (as seen in the Emerging products and services topic in this White Paper) will enable this.

Also key is the ability to enable transparency and comparison on new COVID-19 induced customer criteria. As a consequence, on top of "airlinedirect.com" websites, current market initiatives like "new generation storefront" in the USA, or travel management companies displays, will have to be adapted to encompass the new criteria, in order to enable reliable comparison, within airlines and non-Air providers.

3. Unbundling travel flexibility

One of the defining trends of this crisis has been a shift in customer preferences towards travel. The traditional segments of business and leisure travel have long driven airline product offerings – from pricing and fare rules to bundles and ancillary services. In many ways, customers are now looking for travel experiences that better meet their lifestyle, preferences and wallet. One could argue that the crisis has accelerated the evolution of customer expectations.

Throughout the crisis, visiting friends and relatives have remained a significant driver of travel. Traditional business travel has dwindled, and it is unclear when similar volumes will come back given significant shifts in the popularity of virtual meetings and conferences.

It is impossible to predict with certainty the evolution of these needs. What is essential is for the industry to further unbundle the core travel product into its constituent building blocks that can be stitched together to better meet the needs of these new customers. Deconstructing the travel product would enable us to create compelling personalized offers that better address the emerging needs of post-COVID-19 customers.

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The travel experience can be further deconstructed to:

- Confirmed travel dates
- Confirmed travel schedule – specific departure/arrival dates and times
- Change starting/ arriving points of Itinerary (also to include train/ car segments, etc)
- Earned loyalty program points or miles
- Ability to change confirmed travel schedule
- Re-accommodation in the event of a disruption outside the airline's control
- Re-accommodation on any available travel provider
- Travel insurance

In this new platform, customers can determine and pay only for the travel service that suits their needs (see table 1 below).

Thoughts on a prototype:

- VFR customer picks a destination using map search
  > Picks a date that is convenient for her/him
  > Completes payment and reservation
  > Airline responds with a projected time for the flight
  - 72h before the travel, airline confirms flight time

4. **Integration with new products and services, with a right balance seamlessness vs. easy add-on**

This recommendation is covered under the "Emerging Products and Services" topic in this white paper.

5. **Airline platform flexibility to switch to new modes of operation based on real time travel restriction info**

By looking at all past crises we can establish some typical scenarios that cover most of airline reactions. Even if some aspects may be specific (such as mandatory masks on board for COVID-19) most of the emergency measures are quite similar:

- Waiving of ticket flexibility restrictions, at least partially
- Exceptional refund conditions
- Incentives to keep ticket value
- Special repatriation conditions

Therefore, it seems feasible to define "a priori" some airline special basic provisions, corresponding to the most common or foreseeable future crisis.

Table 1

Travel intent	Product offer	Value to customers
Visiting friends and relatives (VFR)	• Right to fly • Confirmed date • Lowest price available	Offers low cost travel on specific dates based on travel provider's choice of flights
Attending significant event	• Right to fly • Confirmed date, confirmed time • Free re-accommodation – same airline	• Matches current expectations for defined travel plans and low-cost travel • Cheaper option proposed by airline
Theme travel (e.g. sun, ski, etc.)	A range of safe destinations within a time frame; the more defined by the customer, the more expensive	• Fit into budget and date • Optimized costw
Business trip	• Right to fly • Confirmed date, confirmed time • Same day change • Free re-accommodation – any airline • Loyalty credit	Matches current expectations for business travel
Cultural, destination-based exploration	• Right to fly • Open date, open time • Loyalty credit	• Offers lowest cost travel by flying standby or by selecting a date closer in • Option to earn loyalty credit for future travel

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This would allow airlines to provide predefined, ore transparent disclosure of terms and conditions:

- Informs the traveller of how a crisis would impact him at time of purchase
- Allows comparison on airlines crisis provisions
- Supports upsell of bundled or optional products by clearly showing their benefits versus "the new baseline" product

Once each set of special policies are defined, specific "triggers" are built so the airline can switch from "normal" to a specific set of exceptional measures but also to stop the crisis mode and fall back to normal conditions, very quickly.

(*) Insurance:

As for the insurance product, the COVID-19 crisis has demonstrated two clearly different paths for airlines to integrate this attribute:

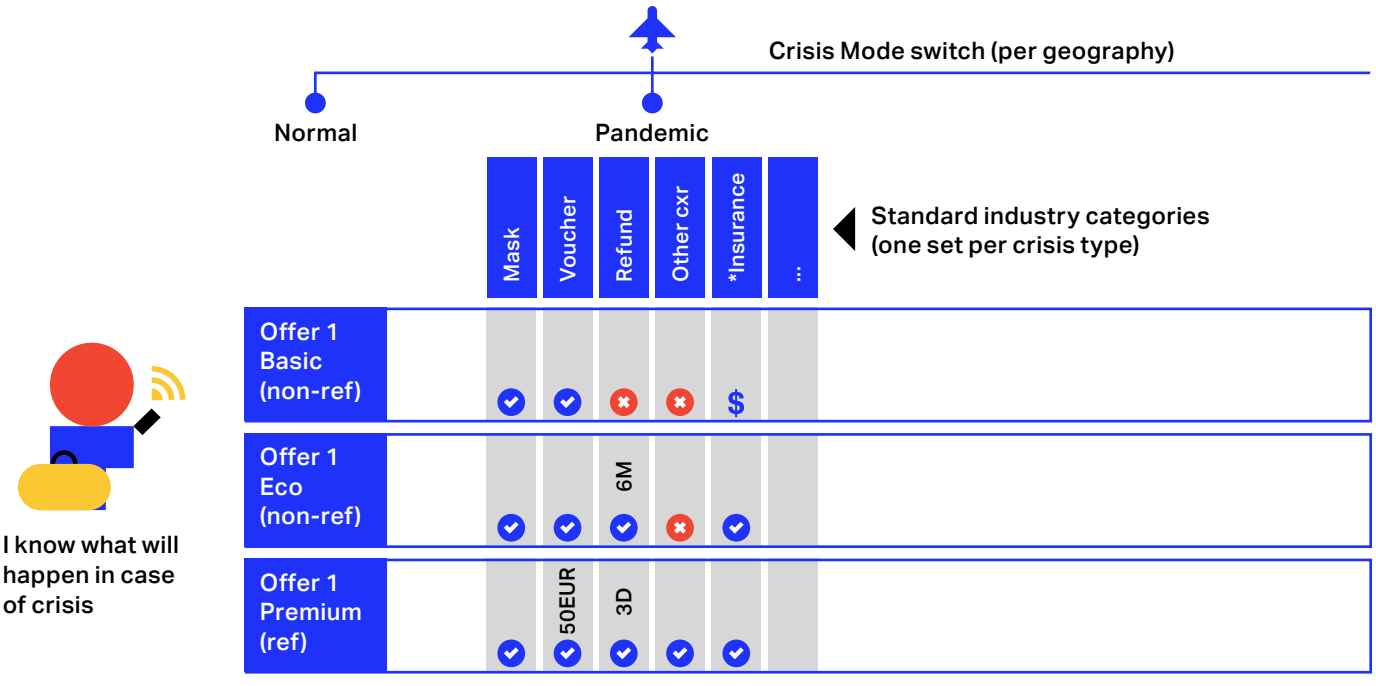
- Insurance as a new added service (additional cost for airline), or as an inclusion as an attribute in upper branded fares, or for all customers.
- Insurance as commission-based service (additional revenue for airlines) however with important changes needed in contract conditions to cover each specific situation (pandemic for COVID-19 crisis).

Benefits

Restoring trust in travel will take time – and the focus on biosafety, enabling informed choices and cost-effective services for customers as they navigate this crisis are crucial to that recovery. Travel is a crucial driver of global connectivity and commerce and will play a significant role in the recovery from this pandemic as well. Improving the resilience of this industry bodes well for future crises as well.

Enabling adaptive airline platforms and deconstructing the travel product further enables the industry to not just respond to future global shocks in a responsive, responsible and viable way, but also cater to the needs of new generations of travellers.

All this will require changes to the entire travel ecosystem – from airlines to aggregators and distributors and various sales channels. However, many of the underlying shifts described here are well underway with existing programs like NDC, that are facilitated by IATA. These programs offering a predictable path forward for design and implementation of our strategic response – and provides an opportunity for us as an industry to accelerate our evolution as well.



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Next steps

It is proposed to partner with technology suppliers and airlines to build:

A/ Examples of predefined crises fall-back scenarios of offers (one or two scenarios)

B / Mock-ups of a booking path based on the new pyramid of needs and total unbundling of attributes

C/ Evaluation of any need of additions to existing standard projects (possible impacts on NDC, ONE Order, etc.? ?)

This would provide a guideline for a more technical outline, with a proposed architecture, and possibly evolutions of recommended practices and standards.

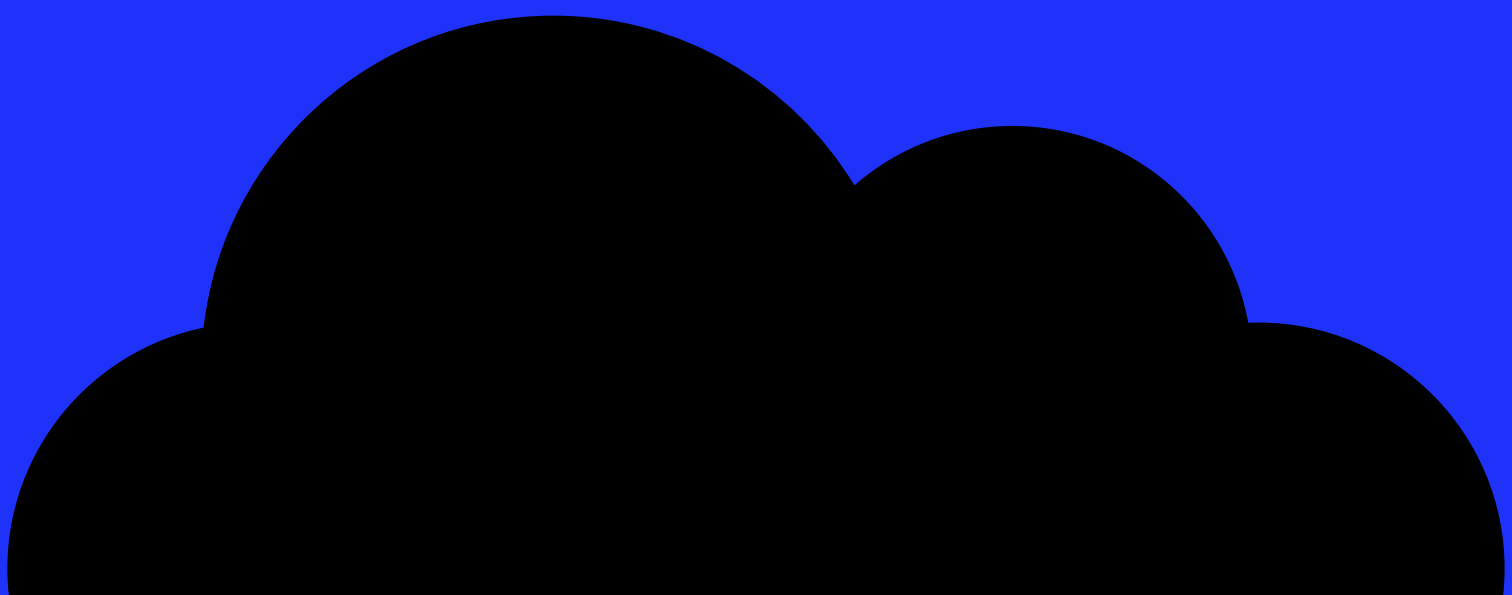
Conclusion

As we write this, we are still in the middle of the COVID-19 crisis. We do not know the complete impact it will have on the industry. However, we can continue to work together to find innovative solutions to help mitigate it and take the opportunity to focus on digital improvements and enabling the industry to become true retailers.

Again, although the ideas presented in this white paper weren't completely typical strategic ideas the AIR Think Tank works on, the focus was on the more short-term industry restart.

In the 2021 AIR Think Tank, the team will review these ideas and assess the possibility to incorporate them into more strategic ideas and aligning them with or creating potential industry standards.

For more information, see the IATA AIR Think Tank page.



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