



NDC

Change Readiness Guide

For Airlines

Edition 5

December 2018



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The information contained in this document is subject to regular review in the light of changing business needs of the industry, government requirements and regulations. The views expressed in this guide are based on the views and opinions of the IATA NDC team.

IATA takes no responsibility for the completeness of this document or the various checklists. The airline is responsible for all decisions made based on this document.

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Foreword

New Distribution Capability (NDC) is a key transformation project to modernize airline distribution. It started with the foundation standard approved in October 2012 by IATA as Resolution 787. This was followed, in August 2014, by US Dept of Transportation approval of Resolution 787, and with IATA delivering the first set of official standards on 1 September 2015.

The NDC standard enables an airline to make sales offers to travel agents directly in real time, and this will also permit airlines to both define and price their products in any way they wish. For customers, NDC will offer greater transparency and choice when shopping for travel as it will address the growing gap between the rich content, upsell opportunities, personalized offers and additional products available on airline websites and more commoditized travel options available through travel agents.

This is the 5th version of this guide. It has been updated to reflect the continuously evolving landscape of airline distribution. As more and more airlines are now live with NDC, relevant feedback is being gathered and where appropriate, shared in this document. IATA's focus has shifted to implementation support, trying to remove remaining blockers to adoption and assisting airlines to achieve large scale market deployment.

Building upon previous versions of this guide, more topics have been included to reflect the evolving airline distribution environment. These

include details on the latest NDC schema versions, from baseline version 17.2 up to planned changes in version 19.1. Also covered are travel agency onboarding (NDC@Scale) and work undertaken with TMCs in 2018.

The content of this guide describes how an airline can exploit the full benefit from the NDC standard. The offer is created by the airline host, allowing airline distribution (direct and indirect) to have a unique source of content. The approach for implementation is modular, exactly fitting the ideal airline strategy. New roles appear, with changes to existing ones (GDSs) with opportunities for new entrants. Going beyond distribution opportunities, NDC can be seen as a major transformation project. Innovative moves for offer creation are now possible: personalization, dynamic pricing, product bundling and upselling. So are innovations for payment. Process flow changes for revenue accounting (with a new relationship with BSP) deliver new positive developments. The purpose of this document is to give a high level understanding of what NDC is and how to get started.

Last but not least, NDC is a standard for API distribution. It is currently based upon XML as this has been widely adopted and used across internet airline distribution providers. In September 2018 with the release of standard version 18.2, JSON translation has been included.

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1. Presenting NDC

1.1. What is this document about?

1.1.1. Objective of the document

This “Change Readiness Guide” aims to support airlines in planning their NDC enablement. From defining the vision and strategy to initiating the program.

It serves as a guideline to support key stakeholders as well as the NDC Program Manager within the airline. The goal is to reduce the amount of time required for the Program Manager to gather all information, engage and involve all relevant departments within the airline and prepare all the material required to successfully initiate the program.

The information and guidance provided within this manual will help facilitate the various discussions and identify the key steps required for a successful deployment program.

This manual is regularly updated with the latest information and best practices learned during the course of the various ongoing NDC deployments.

Some of the latest updates on this edition are in the area of:

- BSP Value proposition
- NDC at scale including NDC collaborative initiatives
- One order updates
- Data privacy considerations
- Servicing and Support

1.1.2. General structure

This handbook consists of three main sections:

The first section presents NDC from a general point of view, with its main principles.

The second section provides guidance on the internal organization of an airline's NDC program, and highlights the key questions and checks to address in order to start an NDC project.

The third section presents future trends and in particular ONE Order.

1.1.3. How to use this handbook

This handbook does not mandate any specific way to implement the NDC standards. It is intended as a support tool to the NDC Program Manager to help guide the way. With the help of this Change Readiness Guide, IATA aims to support the successful initiation of the airline's NDC program.

Depending on the airline maturity, its use may vary, as the general presentation of the NDC basics might already be known. In this case, this first part can be skipped and used as a reference during the course of the NDC implementation project.

This guide should be used by the airline with care and diligence, and always in light of their own situation and environment, and in accordance with any regulatory requirements that they need to take into consideration.

1.2. Industry context

NNDC started in a rapidly changing industry environment, as an answer to three main trends in the airline industry, and as a way to align

channels and provide transparent distribution.

1.2.1. Consumer expectations

Consumers have greater and greater expectations and this concerns also the way they shop, book and pay. They want to be inspired by a rich retailing experience: through product descriptions, rich content, and customer targeting, NDC-enabled retailing can help inspire passengers by making them aware of relevant airline products and offers. NDC-enabled retailing resonates with passengers.

To support the technical implementation of NDC, IATA produced an NDC Implementation guide. See reference in Appendix. They want speed and accuracy: travel websites have to answer within seconds, and when shown, an offer has to be available. They want transparency: they want to know the 'all inclusive' price - no last minute hidden fees (booking fees, card fees etc.) that appear at the end of the process.

They want personalized offers or the ability for themselves to construct a personalized offer by being able to select from a range of product attributes: business and leisure passengers' alike feel comfortable sharing their personal information with sellers and aggregators, provided the data is kept safe, in strict compliance with the appropriate data privacy laws that may apply, and they receive relevant (or enhanced) offers in return.

They want choice when it comes to forms of payment, i.e. be able to use their preferred method in any channel and/or any country.

1.2.2. Airline distribution capabilities

Airlines have heavily invested in IT, and are getting ready to better manage their own offer and its distribution:

- The capability of airline websites is constantly improving, aligning airline retailing with standards of other retail industries, proposing both air-line

(seats, baggage, meals, lounge...) and third party ancillaries (hotels, cars, local entertainment...).

- PSS – Passenger Service Systems (inventory, reservation, departure control systems ...), that were built by airlines in-house in the 70's, have been replaced by systems provided by 3rd party IT providers.
- The consumer is better understood as CRMs' tools are spreading and evolving (e.g. chatbots, AI etc.), with analytical capabilities around Big Data showing promising features for personalization or tailor-made solutions.

1.2.3. Travel agency landscape

Travel agencies use a diverse mix of channels to book clients' flights. Airlines have evolved what they sell, how they sell it and agents have adjusted. The travel agency community is also evolving to adapt to new consumer's needs, and thanks to opportunities brought by modern technologies:

- OTAs and metasearch have grown by focusing on user experience and by being able to process a much larger number of offers
- (airlines, flights, dates etc.) and data (travel solutions)
- TMCs are evolving their model, moving to more servicing (duty of care etc.) and partnering with online booking tools and mobile solution providers. Other players (brick and mortar, consolidators, VFRs etc.) build their strength by differentiating their offer through a niche and value added approach.
- Travel agents are confronted with an increasing complexity in sourcing content (from car rentals, hotels, airlines legacy carriers, low cost carriers) and have a growing need for intermediaries that fully aggregate content.

Next to this, they need enhancements to desktop, mobile and online tools that can



display all the content in one place. They view the booking channel fragmentation as counterproductive; and as NDC-enabled processes are brought to market, NDC providers, which include airlines, GDSs, mid- and back-office software firms, and other travel technology firms, must create ways to present airline products and enable booking via both GDS native displays and through agency desktop applications, which use graphically rich user interfaces.

Corporate Buyers have several objectives:

- Traveler satisfaction: they need to be able to book in a convenient way and on multi devices, anywhere, anytime; they also need to understand what they are entitled to get (for example, in terms of ancillaries)
- Be able to control: they want to ensure that the corporate travel policy is clear and applied in the different systems
- Security and duty of care
- Be able to move from simple fares to product offerings discussion enriching the official corporate channel to satisfy travelers whilst maintaining their travel policy

In 2017, the European and North American TMAG groups, facilitated by IATA started a process to create a travel-buyer led vision of the future of managed business travel. This resulted in two 'propathons', one each in 2017 and 2018 whose goals were to create ideas for new airline products and services for the business travel community and visualize what the key components of a future airline/corporate buyer relationship might look like. The conclusions have been detailed in a white paper 'Time To Fly' which focused the ideas in three areas:

- Total Travel Management
- Real time support to corporates/buyers
- The power of personalization

This demonstrates that NDC can help to support the development of new product & services. Participants were also seeing the

opportunity for an enhanced relationship both between their travelers and their programs and between those value chain participants who support the process.

Tools will help to service the sale of ancillary and personalized products either through Self Booking Tools or via the TMC. Also, the implementation of ancillary sales products and personalization capability means that travel programs can benefit from capturing more data and from targeting travelers with services relevant to them.

There is a growing commitment from Corporate booking tool providers to improve the booking experience and this is good news both for the value chain and the customer.

1.2.4. Some limitations in today's landscape

NDC is in effect the modernization of 40-year-old data exchange standards for ticket distribution developed before the Internet was invented.

IATA was created in 1945 to set industry standards that facilitate safe and efficient air travel (e.g. e-ticketing, bar coded boarding passes, common use airport kiosks, etc.).

In the case of NDC, IATA's role will be to deliver the standards that enable such capabilities for our industry partners in order to offer the passenger the opportunity to have a consistent shopping experience, wherever they shop for travel. The approach consists of using XML (Internet) language to support the delivery of rich content in travel agency and other third party systems, such as the ability to buy additional products and services and to be recognized and receive personalized offers, or shop anonymously, as they choose.

GDSs have been working towards making it possible for airlines to merchandize their

products via travel agents in a manner more consistent with airlines' own websites. IATA welcomes these developments. However, each GDS has been working on its own proprietary solution. In contrast, NDC like all IATA standards, is an open standard available to any and all who want to use it, including GDSs. The primary drivers for NDC is the revenue opportunity through the XML-based standard allowing for product differentiation. NDC will unlock value through the travel agent channel by providing it with features and content that is difficult to access today.

Key revenue drivers:

- Product attributes (differentiation): ability to show competitive features that may be unique to the offer and therefore drive purchase decisions
- Fare Families: displaying multiple price points, with increased value, may drive “up sells”
- Ancillaries: displaying additional products (e.g. lounge access) may drive purchase decision
- Dynamic Pricing conducive to modern offer Management
- Enhancing loyalty with personalized pricing offer (e.g. OMS connects to the FF database to enhance an offer by tier or service experience)
- Rich content to inspire
- Increasing reach. Tapping new sales channels both geographically and digitally

Key cost drivers:

- Moving from a 40-year old legacy infrastructure to an internet environment will make change much more cost effective
- NDC should facilitate new entrants, which should increase competition and drive down costs
- NDC also provides the airline with cost reduction opportunities in the areas of ticketing, payment and revenue accounting and back-office in general
- NDC improves revenue integrity (eliminating

most of costs to manage fare auditing)

- In the longer term, NDC facilitates the airline to be in charge of deciding whether and how to accept a particular payment method
- Performing real time checks in the BSP on travel of agency sales should cut revenue losses from agency defaults etc.

1.3. Evolution of key processes: simplification and autonomy for airlines

NDC has a direct impact on the end to end process for airline indirect distribution. As a consequence, key stakeholders' roles evolve from that of today. This chapter focuses on those potential changes at every step of the indirect distribution process: shopping, sales, payment, ticketing and BSP reporting on the other.

1.3.1. Shopping and booking/ ordering workflow evolution

Shopping: the GDS creates the offer, getting fares, availability, business rules from the airline or 3rd parties (ATPCO).

Booking: the GDS creates the PNR which belongs to the TA, the airline only owning a (partial) copy. With the implementation of NDC, the high level distribution and sales processes, as existing in today's world, evolve towards more autonomy for the airlines. The final business process for indirect distribution becomes close to what exists for direct sales ecommerce today, implying two major shifts:

- The **airline** receives the request and creates the offer
- The airline is the **owner** of the master order, containing the latest information

The intermediary, where appropriate, is called the “**Aggregator**”: its role is to transmit the information (request, then offer). As previously



noted, it does not construct the offer. This role, open to new entrants, can also of course be undertaken by a GDS. This IT provider can aggregate the different offers it receives from

airlines to present them to the TA.

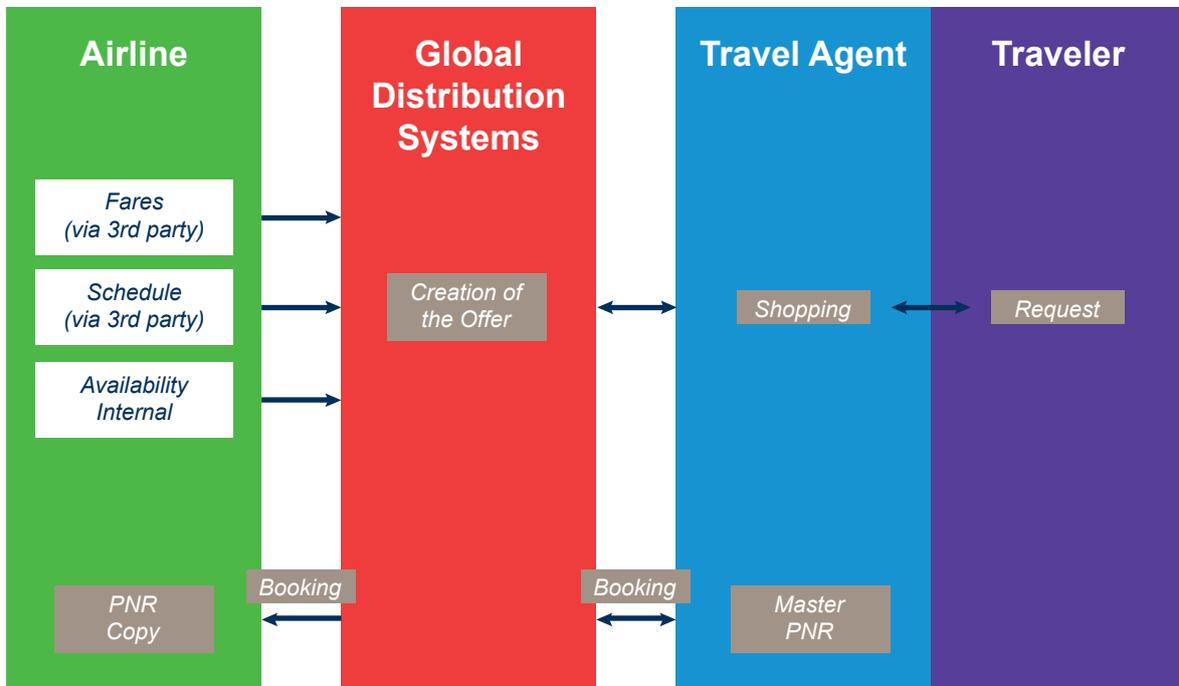


Figure 1: Indirect Flight distribution as today

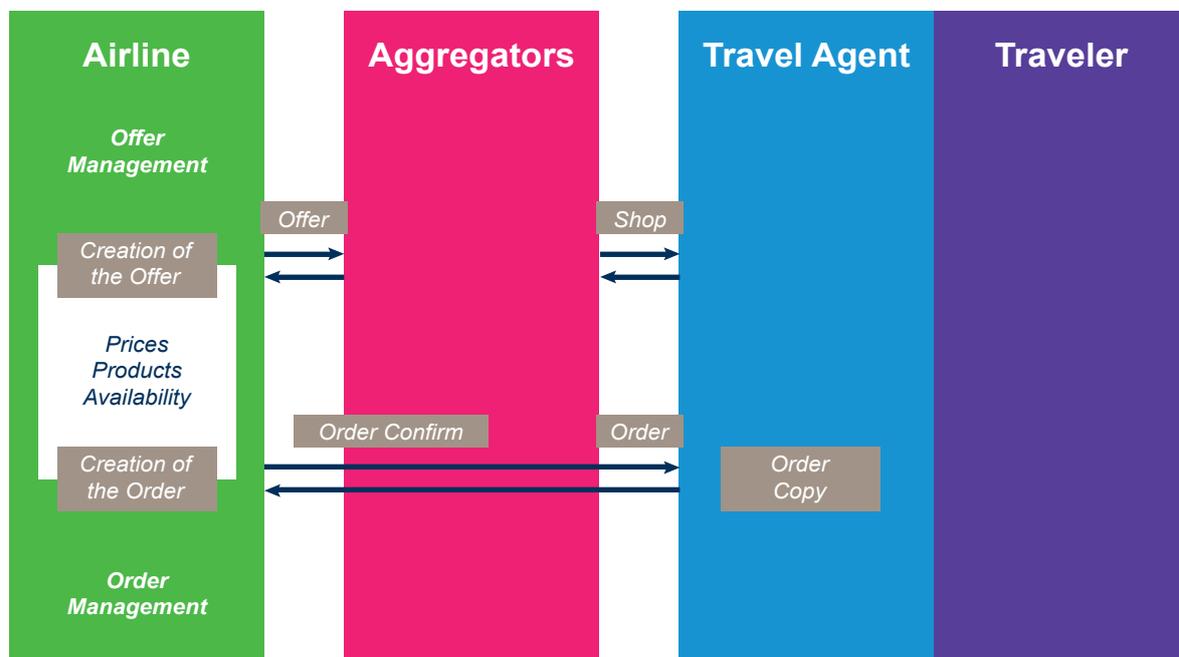


Figure 2: Indirect Flight Distribution with NDC

In the Annex there is a reference to educational videos published by IATA.

1.3.2. Payment

1. Current payment processes in the industry:

- **Collect process:** the money is collected by the travel agent, using its merchant of record, and then settled with the airline at a later stage, using a mechanism managed by IATA called the Billing and Settlement Plan (BSP). In this case the travel agent bears the cost of the settlement and remittance (approx. 10 cents). The airline trusts the travel agent to collect the money, as the travel agent has gone through an accreditation process with IATA (bank guarantees etc). The travel agent may accept any form of payment from the end traveler (credit card, cheque, cash, bank transfer etc)
- **Pass through process:** the travel agent uses a GDS and enters the customer card details, the GDS will then proceed with payment authorization. The travel agent will

never collect any money, the card payment will be credited to the airline bank. In this case, the airline bears all payment costs, both the BSP (for reporting of the payment transaction) and the card cost. It uses its own merchant of record.

Whether a travel agent uses a collect model or pass through model depends upon factors such as:

- **Technology:** does it want to handle money (this requires payment terminal, PCI compliancy for all card transactions etc.)
- **Commercial:** does the travel agent want to bear the payment cost, or does it have a mechanism in place to charge the end consumer etc.

Payment costs an estimated \$7 to \$10 billion to the industry. The cost range is about 1 to 100 for a \$350 ticket, from 10 cents (BSP) to \$10 card. There is a significant opportunity for cost optimization.



Money is held in trust by Travel Agent and remitted to the airline between 7 and 30 days after.

Figure 3: Collect Payment process



BSP used for reporting purpose

Figure 4: Pass through payment process

2. Payment process in an NDC environment

In the NDC environment, the intermediary (called aggregator) does not collect the payment authorization but simply passes on payment details to the airline, using the “order request” that will trigger the creation of the PNR and ET, or the Order.

In addition to being the actual contractual party to the transaction, the airline is in a better position to manage payments generally:

- It can accept / refuse a specific card
- It can process all fraud detection as done in its direct sales

3. Future trends and NDC opportunities

Ultimately an airline would want to apply its complete portfolio of payment instruments to indirect distribution:

- Pay Pal
- Bank transfer
- Pay by instalment
- Air Miles
- Cash
- New and local forms of payment etc.

The list of payment instruments is growing fast, due to the dynamism of the FinTech community in particular.

An airline chooses payment instrument based upon factors such as cost of payment, cash flow (when it is paid), risk of fraud, reach (global vs regional solution).

A concrete example is the bank transfer that could present a great opportunity for the industry:

- Transfer will be instant in Europe, within the framework of Regulation (PSD2), removing the current airline-specific complexity to have the PNR on hold
- Bank transfer could surpass card by 2025

** source Payment Industry Intelligence, July 2017*

for all industries (source: Payment Industry Intelligence, July 2017)

- Lower cost for airlines

Ongoing work at industry level to improve payment capability:

- Enrich the NDC standard to ensure all relevant information is carried (card details but also maybe customer address, or IP address etc)
- Enable new workflows to facilitate 3DS and PCI compliancy
- Secure workflows whereby customer lands on payment page (in a seamless way)

The key principle is that the airline should have the control of payment, but it may decide to delegate this to third party.

1.3.3. Ticketing

Today, once the payment has been accepted, the Travel Agent asks the GDS to send a ticket issuance request to the airline.

The GDS checks the airline has a current ticketing authority granted to that agent, applies a neutral ticket number according to industry rules and sends it to the ticketing airline. The airline then validates it has enough data to issue the ticket and confirms to the TA via the GDS.

With NDC, the travel agent and the Airline work directly together. When the Airline is satisfied with the proposed payment, it issues the travel documents and sends the references back to the TA.

1.3.4. BSP Reporting

Today, after the sale is completed (payment done, and ticket issued), the GDS reports the sale to the BSP that is responsible for cash collection from agents, payment of any commissions and preparation of card remittance files for the ticketing airline. The BSP confirms the transaction with a sales

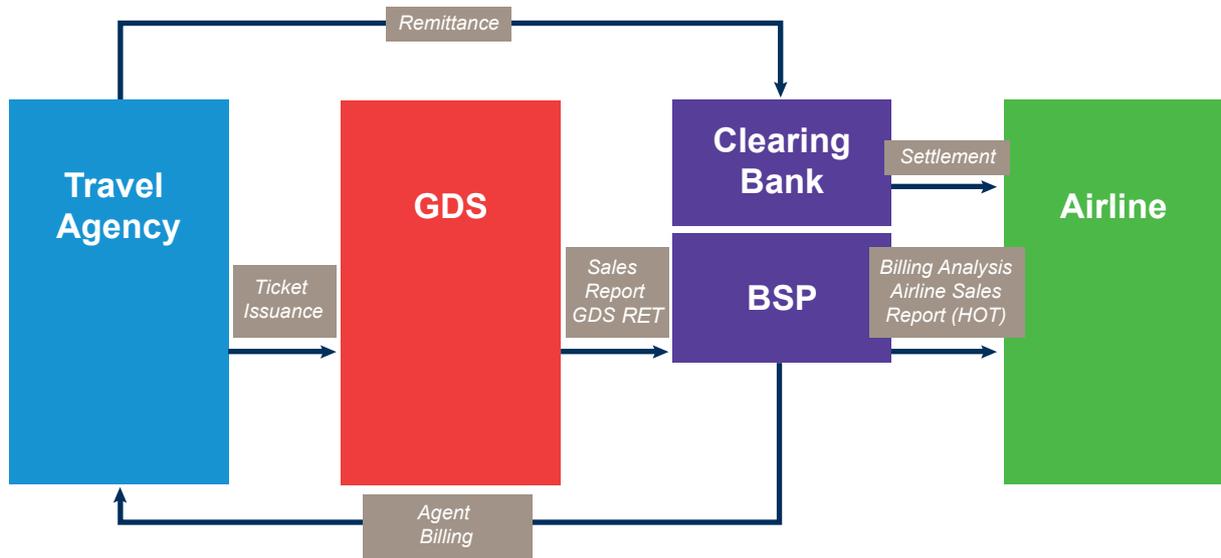


Figure 5: BSP's processes for current sales

report to the ticketing airline that will be used for its revenue accounting processes. Airlines conduct revenue accounting as ticket coupons become flown with revenue matched from the sales reports.

In an NDC environment, the airline is in control of the offer and order management as well as the issuance of an NDC transaction. The airline, with NDC, will benefit from the BSP and its enhanced value proposition, namely:

- Access to an industry distribution framework composed of a reliable and professional network of agents in some 180 countries and territories
- A single standard reporting and settlement process available for airlines and their

appointed agents

- Enhanced BSP risk management functionalities with the implementation of the IATA NewGenISS*
- Visibility and control of forms of payment within the BSP

For more detailed information, see [NDC InFocus - Benefits of Reporting NDC sales through the BSP](#).

The main features include risk management activities before transaction issuance, IATA agency sales monitoring regardless of the sales channels, and reporting/settlement services for both airlines and their partners.

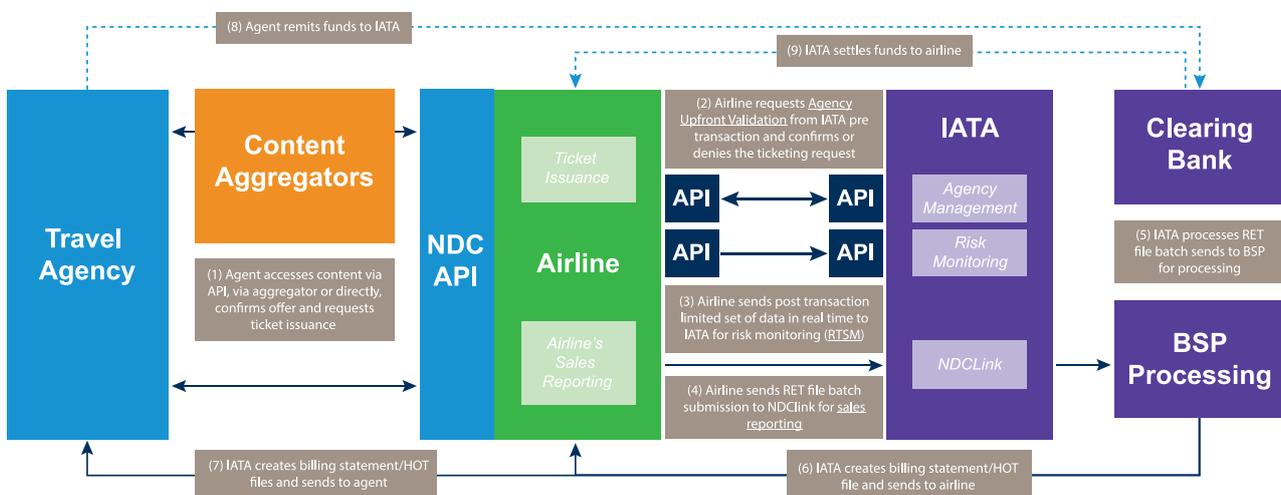


Figure 6: BSP and NDC Complete workflow from Order Create Request to Settlement

*The NewGenISS functionalities are deployed in waves within each BSP as per 2018-2020 roadmap.

The three main functionalities are:

1. An API for Agency Upfront Validation
2. An API for Real Time Sales Monitoring (RTSM)
3. Daily NDC sales reporting (batch process via the NDCLink)

API for Upfront Agency Validation – Available from December 2018

For every transaction, the airline submits a real-time request using an API and receives a reply which allows the airline to either issue the transaction or deny the request. This request will validate:

- If the agent is active or inactive within a BSP
- If the agent is allowed to use a specific BSP form of payment (e.g. cash, card)
- If the agent has opened an IATA EasyPay account to enable that form of payment to be used – applies to NewGenISS BSPs only
- If the agent is PCI DSS compliant*

API for Real Time Sales Monitoring – Available from December 2018

In order to proactively monitor the risk and reduce the possibility of defaults, short payments and bust-outs, IATA requires a limited amount of sales related data (11 elements based on existing sales reporting standards) to be sent for each transaction in real-time.

100% of all agency sales fulfilled directly by the airline including all forms of payment are required to ensure the integrity of the risk monitoring engine. Real time means as close as possible after the completion of the ticketing and transaction-by-transaction. The process is identical to the one currently in place with each GDS.

NDC Sales Reporting – Existing batch file reporting process via NDCLink.

NDCLink is a service available only to BSP participants. The airline must be NDC Level 3 certified and participate in each BSP of the countries it plans to report their agency NDC transactions in. The airline creates a single global sales daily reporting file in the BSP industry standard reporting format (DISH-RET) and sends it to the BSP portal NDCLink. NDCLink conducts data integrity checks, splits the file into separate BSP files and submits them as required to each concerned BSP. Airlines will subsequently receive a report (HOT file) summarizing all NDC transactions along with their traditional BSP sales.

NDC airlines continue to conduct revenue accounting as ticket coupons become flown with revenue matched from the sales reports. By reporting to BSP, airlines avoid the need of a costly and risky parallel billing and settlement process, and can benefit from the start from a consolidated sales reporting, showing both GDS and NDC sales. This is also beneficial for agents, as it allows a consolidated BSP remittance for all sales, seamless integration of NDC sales and improved cash flow.

1.3.5. Interlining

The IATA interline process is an important foundation of the airline industry, allowing passengers to buy one ticket for travel on different airlines, through-checking of baggage, and a seamless airport experience.

In today's world, in indirect distribution, the GDS constructs interline itineraries involving two or more carriers, and applies filed fares.

In this model, each participating carrier may have very little control of the revenue they expect. Each carrier is only able to calculate their share of the revenue (using industry proration rules or bilateral agreements) when they receive the full ticketing information, which may be at the time the flight departs.

**Travel agents currently self-declare their card usage and their PCI DSS status regarding card sales.*

In an NDC world, while creating its offer, the airline may include the services of other airlines. The airline (known as Offer responsible Airline or ORA) is responsible for obtaining content from its own interline partners.

In that case, it sends a shopping request to the partners it chooses. Those partners send back their offers. The partners are known as Participating Offer Airline (ORA). These offers will include product details, conditions, and also a settlement value which will be used for interline billing once the services have been delivered.

The airline can then create a complete offer including its own products and services, together with the products and services of any interline partners which it has accepted. The airline can send the complete offer back to the seller. If the offer is booked and paid, the airline issues its own accountable documents and gets the money. The interline billing with other airlines is then based on the settlement defined as part of its initial offer.

1.3.6. Servicing

As previously highlighted, at the core of NDC is the principle that the airline is in control of its distribution. The bookings (or orders) can be made in the airline IT environment. It does not mean that they won't be accessible by travel agents.

The process will be seamless for the agent or the customer. Upon a request to change an order (ticket in today's environment), the travel agent will make the transaction in the airline environment (that has previously authorized access for this travel agent) instead of the GDS.

1.4. NDC Platform overview

This section describes the key elements of a possible NDC platform.

1.4.1. Offer management

Offer management refers to the capability of airlines to create and return priced offers in response to shopping requests from travel agents.

Offer management is included in the "NDC Shopping" request from a TA and triggers an offer creation from an airline, depending on the items contained by the request. The offer is then proposed to the requester.

The offer management platform enables airlines to distribute their full product offers and to merchandize any additional services using rich content, in an anonymized or personalized fashion.

This may include dynamic pricing. Additional services can be those of any third party with which an airline has an agreement. Offer Management will be needed to request prices directly at the airline level: it can be described in simple terms as a pricing engine.

1.4.2. Order management

Order management is the ability for the airline to create, store and manage its orders. The Order gives an entire view of the various products and services a customer has ordered.

Order management can be as simple as ensuring the PNR, ETKTs and EMDs are referenced with a single identifier (the Order ID). An order may contain related customer information. In a second phase, order management could also be highly sophisticated as in the retail world where every aspect of the order, from product purchase, payment to delivery, is managed.

An Order is a uniquely identified record of the agreement of one party with another to receive products and services under specified terms and conditions. The NDC 'Order' supports the sale of a flexible range of airline products and services that are not necessarily journey based



(e.g. subscription services).

Order management enables airlines to manage NDC driven orders from booking to fulfilment.

Note: Order Management features could naturally be extended to cover the entire lifecycle, beyond fulfillment, to delivery and accounting. This logical extension is one of the aspects of the purpose of the ONE Order Program. (See section 3 of this guide for a more detailed description.)

1.4.3. Examples of features enabled by NDC

The NDC standards schemas support various features, for example:

- The ability to distribute **rich content**: (pictures, videos, sound, VR experiences...): this requires that the airline can create, store, manage this content.
- The ability to offer and sell **ancillaries** i.e. additional products, services or even product characteristics (this could be flexibility on a ticket where the ticket is the product, the flexibility an additional 'purchased' characteristic). In this context, own sourced products and services are in scope, as well as other 3rd parties' products (ground transportation, hotels...).
- Those ancillaries can be sold **"a la carte"**: stand alone, to be added to a flight (or not) or **bundled** (similar to Fare Families) grouped together, as part of a global offer, with a single price.

1.4.4. Examples of functions supported by NDC:

The NDC schemas allow the requester (the customer or the travel agent) to better inform the airline of who they are. In such cases, the NDC standard can support more advanced functions, which the current distribution landscape does not easily allow, such as:

- **Dynamic pricing.** This is a pricing approach in which businesses set flexible prices for products or services based on current market demands. Businesses are able to

change prices based on algorithms that take into account competitor pricing, supply and demand, and other external factors in the market. It may no longer requires fare filing.

- **Personalization:** (or customization) consists of tailoring an offer, a service or a product to accommodate specific individuals.

1.4.5. Existing features improved/ simplified by NDC:

The NDC standard not only supports Interline, but as seen in 1.3.5, it also improves the process significantly.

NDC interline goes further than the current interline process. It refers to two airlines exchanging offers dynamically: the interline partner offers the requesting airline a bid price or partner price for a flight or ancillary product or service, removing the need for proration.

It allows airlines to control the revenue they expect for providing their services and simplifies settlement, eliminating proration, which is complex and can be subject to disputes. Implementing interline has not been a priority for airlines at this point in time.

1.4.6. Aggregation

The concept of Aggregation is a key component to NDC-based distribution. It has three core functions, namely:

- Determine which airlines to ask when receiving shopping requests from travel agents
 - Forward shopping and other requests to the relevant airlines
 - Consolidate the offer responses from airlines and present results to travel agents
- Aggregators can use the 'Airline Profile' to determine which airlines to send an offer request to. With their own airline profile, airlines are able to communicate the markets and parameters for which they are willing to respond to an NDC Shopping request for flights and / or associated services. The airline profile enables airlines to reduce the volume

of messages they are requested to process by filtering out irrelevant requests, however the airline would need to set up a mechanism to ensure the airline profile is updated when they change flight schedules or add new services.

1.4.7. NDC general Architecture

The chart below, widely shared by IATA, gives a global overview of all described items, and promotes modularity and standardization. Features are organized into layers: on the bottom, are all existing applications, including PSS. At the top the presentation layer with all possible distribution channels, direct and indirect.

In the middle, the new airline retailing layer with the two core blocks: Offer and Order Management.

The integration layer makes the links between the existing functionalities and the new ones, in a scalable and cost effective manner. Security and Identity Management module allows secure NDC end to end transactions, and well identified actors Management. The integration layer makes the links between the existing functionalities and the new ones, on a scalable and cost effective manner. Security and Identity Management module allows secure NDC end to end transactions, and well identified actors.

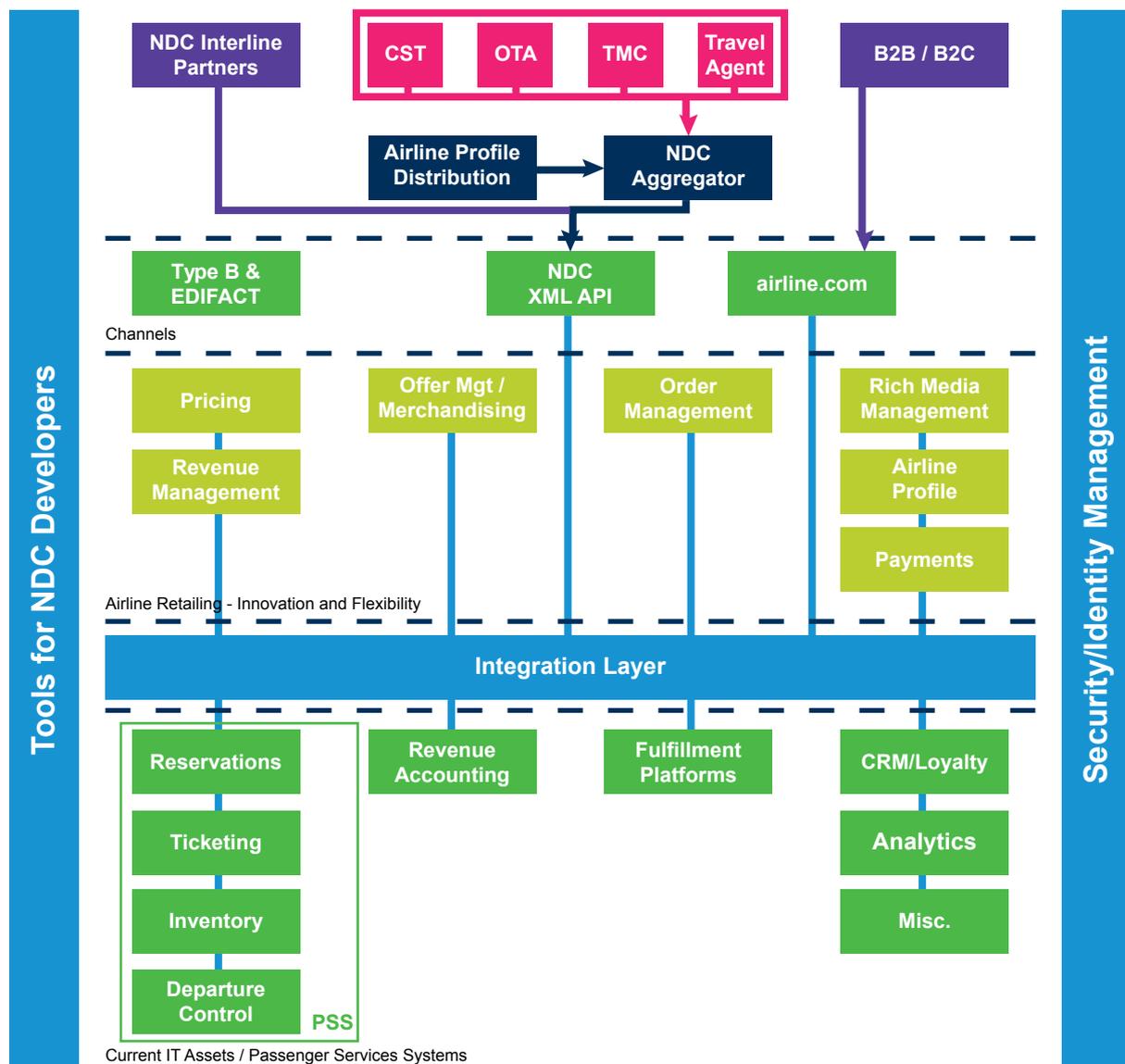


Figure 7: NDC reference architecture

1.4.8 A TMC reference Architecture

A key question for an airline to ask itself when considering an NDC deployment is 'How will my development impact my key Travel Management Company (TMC) partners?'

IATA have proposed a reference architecture that provides a framework for TMCs to build a modular IT infrastructure. The reference architecture highlights the important components a TMC may wish to consider for the successful implementation of NDC. [See the TMC Reference Architecture graphic online.](#)

The main objective is to address current feedback on mid- and backoffice blockers to NDC adoption and create a tool to help and inspire the travel industry:

- For TMCs to think about their future IT (from small to large TMCs)
- For IT providers to identify technology needs and build solutions
- For airlines to better understand the complexity of the travel agency environment and requirement

1.5. The NDC Value Proposition:

A glance at the overall scope of NDC shows

areas of both revenue and cost opportunities at every step of the general process, from shopping to payment/BSP.

1.5.1. Revenue Benefits

Revenues are a direct consequence of the additional features provided or supported by NDC, as explained above.

Rich Content allows the airline to display comprehensive content (for example: videos, pictures and description of the product), and therefore increase yield through product differentiation or gain market share through a more competitive product offering.

By enabling customers to purchase relevant **ancillaries (a la carte or bundled)**, the airline may generate additional revenue. The number of ancillaries sold can be increased as airlines are not dependent on implementing each ancillary with their distribution partners independently. Instead, they are able to offer limitless products and services according to their marketing strategy.

In case the airline decides to implement **dynamic pricing**, it creates a potential for additional revenue through enhanced revenue management. Revenue managers get more flexibility, and better opportunities to optimize the revenue flow.

	Shop	Order	Pay
Revenue Benefit	<ul style="list-style-type: none"> ▪ Rich content ▪ Ancillaries ▪ Dynamic pricing ▪ Personalization 	<ul style="list-style-type: none"> ▪ Improved bookability ▪ Reach new sales channels ▪ Manage all your customer orders 	<ul style="list-style-type: none"> ▪ Additional means of payment
Cost Benefit	<ul style="list-style-type: none"> ▪ Simplified Interline ▪ Simplified fare filing ▪ Standard API for all indirect channels 	<ul style="list-style-type: none"> ▪ Less need for revenue integrity and ADM 	<ul style="list-style-type: none"> ▪ Simplified Interline Billing ▪ Better managed payment cost

Figure 8: NDC value proposition

The airline might also go for **personalization**, enhance its CRM to be able to propose tailor-made offers to their customers, which should lead to improved look-to-book ratios, as well as strengthening customer loyalty for future sales.

NDC Interline significantly simplifies **Interlining** and transforms this step into a new revenue opportunity. As explained above, whenever an offer needs to be completed by a partner, this can be done dynamically, with the partner making its own offer for the part it needs to cover, – for flights and/or ancillaries, hence a real enlargement/improvement of usage, especially with close partners. Typically, this can be very beneficial within an alliance or airline grouping.

In addition, NDC provides the opportunity for airline products to be more “sellable”, by being presented to **additional channels** (e.g., direct connect, new aggregators, etc.), or by offering additional means of payment. More sellable, in the sense that the airline's offer is presented in more “windows” (channels) hence more likely to be seen and sold.

Currently, airlines are confronted – in some instances – with significant sell failures, due to non-synchronization between availability displayed for example in an OTA (or a metasearch) and its own inventory. NDC provides an opportunity to solve this, hence increasing the ability to book.

1.5.2. Cost benefits

Implementation of the NDC standards can also drive cost benefits.

Airlines may choose to file fewer fares and rely on dynamic pricing. In this case, the airline's current **fare filing** processes can be simplified and therefore lead to lower costs: reduction in the cost of administration and management. Being exposed through an **additional channel**, besides creating potential revenue increase, as seen above, may also allow the airline to benefit

from potential distribution savings.

In the longer term, taking advantage of the standardization proposed by NDC, a common **API** could even be sufficient for an airline to propose its products to all indirect channels. Less complexity means less structural costs. Airlines will also save costs thanks to **simplification of the interline process**.

They may not need to file the interline agreements as today. On top, interline settlement disputes could disappear as the settlement values are communicated and agreed up front, at time of shopping: interline billing is then straightforward.

As the airline produces the Offer and is responsible for the Order (booking and ticketing), it manages much more closely how its product is sold, with less risk of interference (thanks to the notion of Offer and Order ID). Therefore, a number of **revenue integrity** checks are no longer needed, and the airline (as well as its travel agent partners) can expect a significant reduction in ADMs.

Finally, in an NDC environment, the airlines retain **control of payment**: they can decide how they want to be paid, which cards to accept under what circumstance and/or implement alternative forms of payment.

1.5.3. Benefits for Travel Agents

To build NDC solutions, Airlines need to closely work with TA partners.

The NDC standard is "**channel**" agnostic. It can support a direct relationship between airlines and agents. It can also support a relationship in which an Aggregator connects to the airline to access content it will aggregate and pass on to its travel agent clients. Travel agents will find a real improvement in NDC with better access to offers and better accuracy.



A Travel agent can expect **better productivity** from its agents: they will be able to deliver more value to their customer, benefiting from richer and more consistent offers from the airlines, true comparison shopping, and transparency in pricing and content.

Better productivity for TAs could also be expected, as the current multi channels situation (several systems, for LCC and others, to sell tickets and then ancillaries, with reconciliation of data on top), should be simplified by integrated solutions, where the offer comes as a whole in one system only.

Better accuracy, and less risk of errors are also benefits to be expected. Offers as transmitted by airlines contain their conditions as a package: offer time limit, acceptable types of payment. Rules are part of the offer, therefore agents avoid interpretation mistakes (of complex fare conditions for instance) and synchronization errors which occur today with multiple entities involved in constructing an offer, and corresponding ADMs.

Travel Management companies' (TMCs) position is specific among TAs: they service both Travel Managers and Corporate Travelers. So they end up in the middle of the debate between tightly managed travel -cost control, risk reduction- versus total freedom in business trips booking.

NDC can help TMCs propose the best of the two worlds to their customers: cost containment, reduced risk and enhanced traveler experience, as it allows personalization.

Personalization requires that each corporation deeply analyses its travelers and their needs, hence a variety of business service opportunities for the TMC community:

- Analysis of individual traveler profiles
- Construction of adapted products (bundles, tailored fares)
- Adjustment for small and medium

enterprise (SME customers)

- Negotiation support with the provider
- Furthermore, TMCs can provide their customers with detailed reports to validate their initial strategy choice to accept personalized offers.

They can give them the opportunity to choose whatever distribution channel is better for them (direct API, GDS)

So NDC gives TMCs the opportunity to propose each corporate a tailored structure, and improve their current services.

IATA has produced a Change Readiness Guide for Business Travel that highlights the NDC value proposition. It covers the travel manager, the corporate booking tools, and the travel management companies. (see reference at the end of this Guide).

1.6. Current status of NDC implementation:

IATA released the first official version of the industry standard in September 2015. Several updates have been produced since then, the most recent version of the schema being 18.2.

This new version builds on significant enhancements from 17.2 in terms of robustness and consistency, which will make NDC implementations for airlines and technology providers more effective and faster to market.

Key features from latest NDC schema releases

NDC 17.2 has been cited by the industry as providing the stability required in order to move forward with industrialization and mass adoption of the standard.

The 17.2 release reflects the structural enhancements that support robust retailing capabilities. It completes the changes that began in 17.1 to align the Offer and Order structures in the NDC schemas to support a

consistent interpretation of the standard by software developers. On top of the changes made in 17.1, there are: enhancements to Shopping, Seats and Order Servicing capabilities, the first data structures derived from a new Airline Industry Data Model (AIDM), removal or renaming of messages and additional schema enhancements and technical cleanup items.

The NDC 18.1 contained many of the changes incurred from the alignment to the AIDM, and the full set of changes from this exercise was completed by 18.2 released in Q3 2018. This largely means different data element names and concepts to adhere to the AIDM guidelines rather than any fundamental redesign of the schemas and the way they function. Therefore, anyone designing their implementations on NDC 17.2 will not need to redesign processes and application logic. Instead the focus will be on re-mapping data elements.

Further details of recent NDC schema changes can be found in NDC InFocus document [‘Highlights of 17.2 and what to expect in 19.1’](#).

1.6.1. Towards Industry Readiness:

To date, 124 airlines have deployed NDC or have plans to do so (+10% compared to 2017). Also close to 150 companies are NDC certified (including 65 airlines and 60 IT providers). Airlines that are NDC capable, transport over 60% of passengers flown on IATA carriers.

In particular, 20 of the top 25 airline groups have adopted or are working towards adoption of the NDC standard.

Those overall figures highlight that NDC is now on track to become mainstream.

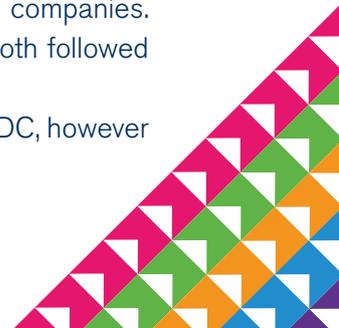
From 2018, the IATA NDC program moved to a new phase which will consist of supporting volume growth versus airline capability.

This is an important step forward, and a change of mind-set. Deployments have to

scale, and this is quite different from current implementations that often involve one airline with a small number of travel agents and “small” aggregators.

The good news is that the value chain is engaged:

- The GDSs have all implemented NDC and have achieved NDC Certification as aggregators, described elsewhere in this document
- Amadeus has signed in August 2018 two new partners to its NDC-X program, an initiative focused on practical use cases for the adoption of the New Distribution Capability (NDC) standard. Carlson Wagonlit Travel (CWT) and American Express Global Business Travel (AmEx GBT) have both joined the program, which will allow them to help pilot Amadeus’ new NDC-enabled solution. The Amadeus platform will mix sourced content in a seamless manner
- Sabre, in September 2018, announced “Beyond NDC” collaboration relationships with Finnair, Singapore Airlines and United Airlines as well as 3 agencies (Amex, BCD Travel and Corporate Travel Management). Sabre will also mix GDS sourced and API content
- Travelport has implemented NDC as a pop-up on their distribution platforms. In H1 2019, they will integrate airline NDC APIs into their platform and in H2 2019 they intend to launch a new desktop
- Metasearch companies have embraced NDC as they find an opportunities to improve their model and flow: the customer can complete its transaction while staying in the metasearch environment, instead of being redirected to an airline website (deeplink). This improves conversion ratios. We have seen several of these deployments by airlines with Metasearch companies. Skyscanner and Kayak have both followed this path
- TMCs are engaged to adopt NDC, however



not all TMCs have the same level of readiness. Among the largest ones, HRG has made the most progress, building a platform that can aggregate content from different airline APIs. IATA implemented a GTEC, Global Travel Executive Council, to further engage TMCs

- Online Booking Tools are also engaged, with for example Concur having recently announced they will access some NDC content via an aggregator

IATA has been actively working with the corporate travel manager community through the Travel Manager Advisory Group (TMAG) in Europe and in North America to understand how the NDC standard will affect this community in terms of challenges, opportunities and benefits. This group of 25 travel managers and procurement professionals is acting as a sounding board for IATA:

- To present updates and new initiatives which may affect the corporate market
- To maintain a dialogue with IATA on issues affecting corporate travel programs
- To create a vision for the industry to adopt and benefit from NDC technology
- Current deployments include carriers from all parts of the world. The detailed list is published and regularly updated on the IATA NDC website

Besides airlines, almost 60 travel technology vendors are building products and solutions based on NDC. IATA is engaging with the industry through numerous meetings, working groups and conferences.

It organizes hackathons to get developers to build solution using the NDC standard. It has also set up an industry Business Travel Summit to gather airlines, IT providers, corporate buyers, TMCs and distributors.

The next step in the NDC deployment will be to get mass market deployment and adoption, with all large travel agency networks engaged.

Airlines' views of what benefits NDC has brought or can bring in the future.

1.6.2. Enlarging the scope

Initially, NDC has been focused mostly on ancillaries.

Air-related ancillaries cover the areas of seats, baggage and change fees, whereas the non-air ancillaries focused on travel insurance, car services, lounge access, Wi-Fi, meals, duty free and special services such as wheel-chair and Meet and Assist. The main attributes have stayed the same since the launch of pilots in 2014, in the area of seat allocations and baggage.

However, it is very clear that carriers embracing NDC now have a much broader vision of the business benefits and are embarking upon a much more complete project. By building an offer and order management system, they are putting in place the right framework to get full NDC benefits.

There are numerous end states, and each carrier will decide upon expected business benefits, and transition complexity etc. So far IATA has identified two broad strategies: The first focuses on improving customer value through efficient dynamic pricing. Ultimately, the vision is to enhance the optimization process, based upon customer value, travel history, etc. The second focuses on simplification and modernization of the PSS. NDC in this case is only a first step towards an API that serves as unique source of content.

The more recent NDC projects have a larger size, and impact airlines well beyond just their distribution departments. The following chapter will describe how to setup an NDC project and highlight those who will be key stakeholders.

2. Implementing NDC

2.1. Approaching the size, scope and case

The many live implementations have confirmed that a full NDC implementation can be a very large program and based on experience, the duration is usually not less than six months, and can go up to two years depending on the scope of the project and the resources available.

Nevertheless, considering the wide scope of benefits and its potential modularity, the NDC program need not necessarily be that large. NDC is not a one-size-fits-all implementation. Nor is it a plug-and-play implementation. What an airline does with NDC largely depends on what it wants to do! As airlines embark, or continue on their respective NDC journeys, competition is expected to increase, resulting in enhanced customer value and benefits.

2.1.1. Size and scope of an NDC implementation

The size/shape of the program for your airline greatly depends on:

- What you plan to use it for, (what is your strategy)
- What your current status is, especially from an IT point of view
- How you see it: as a whole or as an addition of several small projects

Airlines may choose to put the focus on Offer Management or to extend their capability to deploy an Order Management solution as well. Some might want to use NDC to deploy a more flexible ancillary platform, others may choose to go as far as dynamic pricing.

Some airlines already have certain IT components, or in some cases, even some

NDC capabilities (e.g. airlines that already have APIs with XML connectivity). Others will be starting from scratch with only a very basic e-commerce platform which may only partially suffice for NDC.

An airline could choose to do one large program, implementing a wide range of the NDC components. On the other hand, an airline may choose to break it into sub-projects of various smaller modules, giving priority to lower risk or higher value components, and only deciding on the next step once the first one reaches completion.

The choice of the approach may be a decision based on cost, risk, available skillsets, and other projects running in parallel. There is no 'right way' except the way that suits your airline and environment best. The most successful NDC program will be the one that you can manage in a controlled fashion.

2.1.2. Approaching the case: key questions, benefits and costs

Prior to building the business case, several considerations need to be made. They are described in chapter below.

To begin with, the airline's **contractual situation** will be a key dimension to be considered. Both the commercial contracts with distribution partners, as well as contracts with PSS and other IT system providers must be reviewed at an early stage to measure constraints, and potential costs associated with them. (See business checklist).

One more traditional early step will be to determine a **roadmap**. From a phased



approach, breaking the program into small sub-projects to a big bang end-to-end implementation, the airline will need to decide what it is ready to take on. Whereas a short project with limited ambitions might take 3 to 6 months, a full transformation project is likely to last at least 2 years.

If the choice is a phased approach, then there are various options to build up the capability over time. The path an airline will choose will depend on its **immediate needs** and its NDC strategy. The steps should be defined based on the airline's priorities, not vendor availability and capability.

The **channel strategy** is also critical: which channels will your NDC strategy address, and in which order? This will have an effect on the business case, as the value derived from various channels may differ greatly.

Different paths will obviously deliver different benefits, and at different points in time of each NDC journey.

The **cost** aspect of the case must be carefully reviewed as well.

There will be program-related costs as well as operational costs after the project. The program costs may include software licenses, customizations, integration efforts and implementation costs. From a business

point of view, the costs for training, marketing, communication etc. must be taken into account.

The operational costs will depend on your individual choices but could include ongoing maintenance fees, support fees and yearly license costs. If your airline chooses to operate the systems, then there will be additional hardware and potentially network and storage costs to consider.

Airline are looking to directly offer their products to travel agents and other third party resellers. This will enable them to better commercialize their products and services. One of the possible leverage is to get Travel Agents to connect to their APIs, directly or using an aggregator.

The different flows are:

- GDS legacy : is the current flow, whereby the GDS constructs the offer
- GDS acting as aggregator: the GDS solely transmits information between the travel agent and the airline, it acts as a pure aggregator and does not construct offers or process with payment authorization
- Direct connect: the travel agent connects directly to the airline API (it needs IT capability for this)

The graph below summarizes the different options.

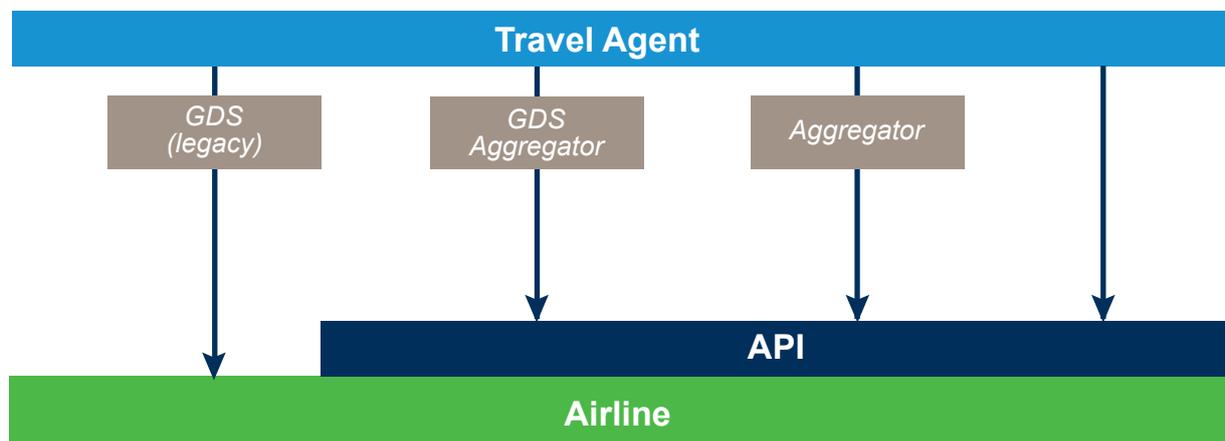


Figure 9: Content sourcing

2.2. Program Management

2.2.1. Check the direct stakeholders

The NDC program should first set its own overarching organization. NDC is a strategic project, which involves influencing and convincing senior management. So a direct link with the executive board is essential. Furthermore, as with any program of this magnitude, it should have its own structure:

- Steering Committee
- Executive Sponsor
- Program Team

But NDC also involves breaking silos, and getting departments working together. As a consequence, key departments have to be identified and actively participate from the start of the project.

The checklist in paragraph 2.3 should help the NDC program manager to identify the correct departments and their possible roles within the program.

Each airline is of course unique in how the organizational structures and responsibilities are assigned, thus this can only serve as a high level guideline. Airlines will need to adapt this for their own use.

2.2.2. Distribution, Marketing and Sales

As NDC is a distribution-focused program, this department should typically take a lead role in the overall program.

Depending on the organization of the airline, Distribution might be a stand-alone department or depend on Marketing and Sales. In any case, reflecting its key role in defining the products (for instance by creating a new ancillary), this department has a prominent role to play.

The distribution representative must ensure the NDC strategy is a key enabler to the over-

all distribution strategy and will play a critical role in coordinating and communicating with the various distribution channels and partners throughout the program.

The program will affect stakeholders outside of the airline, such as travel agencies, travel retail companies and corporate buyers. Those external contacts are critical to its success. Sales team will be eager to know the status of the NDC program and should be involved in the very early stage of the program. Their jobs may change as a consequence of NDC, for example discussions with large corporate customers may be focused on long term value, new products and services available in the NDC API etc. – hence their job descriptions will evolve.

It is crucial that an airlines's local offices and sales teams are kept fully briefed and educated on the airline's NDC strategy and offerings. They will play a crucial world in transitioning travel agents and corporate clients to the changes the airline implements and ensuring that the clients take full advantage of the enhanced content and offers.

2.2.3. Choosing travel agencies

When the sales strategy is in place, the next step is to select travel agencies. This will go in two steps. First select one (or several) travel agencies to pilot NDC. This can also be a metasearch, for example. The second step is to go towards wider adoption.

Define your key expectations from the pilot? Do you want to test scale, or servicing, or business model etc.

Define how you will grow the number of travel agents and the distribution mode
Ensure processes scale up.

Understand the commercial dynamics, determine future vision



2.2.4. Revenue Management and Pricing

Many components of an NDC program will be influenced by Revenue Management and Pricing (RMP). For many NDC features, especially dynamic pricing, RMP will be the driver behind how these mechanics will work, and will shape the business requirements for NDC usage and any NDC platform(s). They will also be heavily involved in determining the ancillary offerings and their prices.

Dynamic pricing is a highly complex component requiring substantial attention and testing. The RMP department must be represented in the core NDC Program team to ensure that items such as platform assessments also cover their requirements.

2.2.5. Information Technology

The technology or IT department will carry a large portion of the program execution efforts. While this is not a pure IT project, the (new) IT platform(s) are the key enablers to all features in the NDC standards. The involvement of the IT department in the platform assessment and overall program setup will contribute greatly to its success.

In order to fulfil the **complex business requirements** of the various business departments, the IT department must be clear about their requirements, as early as possible. A wrong platform assessment early in the process due to a lack of understanding will cost time and have negative consequences throughout the program, and even after the program is completed.

In their assessment, the IT department should consider factors such as overall architecture as well as scalability and integration. The ability

of these systems to grow with the volume and transactions over time will be paramount to providing a sustainable IT environment.

A strong and consolidated vision will be mandatory to build the architecture the airline needs to implement its business strategy.

The IT department will also have to focus **on integration**. Various system components will need to interact and interface with each other for the components to work seamlessly, for example PSS, ecommerce systems, merchandising components, new NDC components, payment systems, etc. It is recommended that the IT Architect puts a strong focus on integration and modularizing processes at a very early stage of the evaluation of the platform(s).

2.2.6. Finance and Revenue Accounting

Another key stakeholder in the NDC program is the Finance department. Within the realm of Order Management, and in that area specifically payment processing as well as financial accounting (settlement and billing), there is a large potential for efficiencies.

For instance, if the NDC strategy involves additional distribution channels, additional payment methods via the new sales channels will be an additional challenge. It will likely include a wider variety of payment options in multiple countries.

2.2.7. Program Management

While Program Management isn't a department per se, it is worth mentioning this role specifically. Prior to the start of the program, ideally during the assessment phase, a program manager will need to be assigned.

There are differing policies within airlines as to where programs report. In some cases, program

management is done in IT, in others, it sits in the business departments. In the case of NDC, IATA recommends that the selection of the role and the respective reporting lines be carefully considered. In any case, the NDC program is a business program, with a business goal. The program manager will need to be close enough to business departments to share their language and clearly understand the business purpose of his program, both initially and as the program develops. The size of the program may have an influence in the reporting position. A smaller NDC program which may require a few updates within various IT systems but less overall coordination with business units and external entities, may well be driven by the IT department.

However, a larger NDC program with strong dependencies on pricing, on channels distribution and other business related topics may benefit from having key stakeholders such as the distribution team take over the program management responsibility, to ensure the outcomes meet the expectations of the business.

In even larger programs, IATA recommends that program ownership rest with the key business stakeholders, with project managers in the various departments such as IT to focus on the various sub-projects.

2.2.8. Airline Support and Help Desk

Critical to any NDC implementation is the support an airline offers to those companies that connect to the airline. This could be in the form of a help desk, additional customer support or other customer support. Areas support will be needed include IT support for the NDC deployment and system performance, as well as customer service support for functionality issues or guidance.

There are several key areas of support that need to be considered:

- a) Response times – is the system responding within an agreed timeframe. If not, then how will the airline rectify this?
- b) Availability. Internet bookings means that it is desirable to be almost 100% of the time. What are the contingencies if there is a system failure? What about scheduled maintenance and system upgrades?
- c) Gaps in functionality. Is every possible scenario covered? If not, how does the airline plan to handle processes that cannot be managed through the NDC implementation. For example, does the airline have automated solutions for involuntary changes, groups, order changes etc.
- d) System capacity. It is likely that when an airline initially deploys NDC, the volume of transactions is not likely to cause any system capacity issues but will this still be the case as more and more travel agents connect and the volume of transactions grows incrementally. Airlines can expect a much higher load to book ratio than for traditional GDS-based bookings and the system must be able to cope with this growth. Can the system cope with unexpected spikes in activity?
- e) Error management. The greater the software changes, the greater the likelihood that there will be errors in the initial deployment. NDC is a major transformative project and airlines should plan on what support to give for any identified bugs in the software or gaps in functionality.

2.3. Business check list

Where are you limited in the distribution of your product today? What would you like to improve? Those two questions should be your starting point for NDC.

This chapter provides check lists, with questions to be answered in the different domains, whether by the Program Manager (internal to the Program) or by the Departments which are close to the program. Those questions should be answered prior to starting the program, and



the answers well shared and communicated.

Specific questions for the program itself (organization, stakeholders, communication reporting) conclude the chapter, as an internal check list of the program.

2.3.1 Global Strategy and Distribution Vision

Where do you want to go by implementing NDC? How to think about the revenue benefits? Are you aiming for upsell or extra pax? What is your final goal, what would you like to achieve? Answering these strategic questions are the core of the program.

It is the first task of the program manager to ensure that the vision around NDC is as clear as possible. So here is the corresponding list of tasks:

Ensure that the NDC vision is well understood and shared among the stakeholders, top managers and especially sponsor.

Define your own high level NDC strategy.

What is your distribution strategy: direct sales, all channels? Create a new channel with NDC?

For each sale made through an NDC channel.

What is the extra profit coming from the ancillary sales?

Do you expect any saving in distribution costs?

How do you want to use NDC: which parts, which components? Which are the current gaps that you would like to fill with NDC new features?

2.3.2. Marketing and sales strategy, ancillaries' development

NDC requires a good definition of your product, without the current constraints of today's distribution.

Define your overarching ancillary sales and merchandising strategy: are you aiming at distributing internal ancillaries, 3rd party ancillaries or both? Which channel delivers the best ancillary sales? , so how do you think NDC will perform?

Are your distribution processes defined and aligned with NDC distribution?

Where do you want to sell (which markets)?

Understand your distribution ecosystem (related to NDC) and who your partners are which support NDC (direct and via an aggregator)

- Who will consume your content and how?
- Who and how will sales / customers be serviced?

Ancillaries: go further:

What do you want to offer short term? Which products can provide quick wins and quick implementation?

What do you want to offer mid- to long- term? Which products are more complex to fulfil or service?

What are your competitors offering? Do you want to align or differentiate?

How well are your sales channels aligned in what you offer? Do you want to align or do you want to differentiate?

Rich content supporting the Airline brand - many potential customers don't know the airline product or reputation.

What type of seat is offered in Business class?
Why buy premium economy?

What is the quality of onboard meals?

Ensure that the various business units adapt their strategy and roadmaps to cater for the NDC strategy. Involved departments include, but may not be limited to:

- Distribution
 - Revenue Management & Pricing
 - Sales & Marketing
 - Ecommerce
 - Ground Operations
 - Revenue Accounting
 - IT & Technology
 - Customer Experience
 - Legal
-



2.3.3. Business process engineering

NDC will change the distribution process, but processes after sales will also be affected.

Here is a review of the different aspects to be checked:

Define services provided for the sold items in case the customer is requesting (voluntary change, cancellation...).

Define services provided for the sold items in case of disruption (involuntary change...).

Define consequences of system disruption.

What is the agency support in case of direct connect? In case of an indirect non- GDS sale?

Analyze and measure the potential consequence of internal servicing of the order.

Complete a high level processes map to identify the affected organization and processes.

Check the training that might be necessary.

2.3.4. Link with IT

This list will remain high level (see next chapter for the platform assessment itself).

Communicate with IT to ensure that the NDC business strategy is shared.

Idem for business needs and requirements.

Share with IT the potential difficulties of NDC integration within the existing architecture, define specific points (applications) of complexity.

Check if IT would cope with such a program: e.g. scope of project, volumes of transactions etc. Will external help be needed?

Check the understanding of data privacy for IT.

Check data security and PCI compliance.

Check the IT procurement part: type of contracts: SAAS, self-hosted?

Are current systems capable to be updated or already at the limit of their capability?

2.3.5. Legal

Both Legal and Procurement need to be prepared for NDC. Implementing an NDC based solution can be disruptive if an airline launches innovations and new processes. Contracts often include clauses that might restrain the airline from moving forward towards those new behaviors.

Review PSS contracts

- Restrictions on distribution by channels
- Restrictions/Costs of 3rd Party integration
- Restrictions on data access
- Restrictions on using other technology suppliers
- Transactions definition, volumes and costs, in particular for those associated with offer creation
- Search costs, costs related to merchandising
- Is NDC mentioned, and how?

Review GDS contracts

- Restrictions on distribution by channels
- Content supply obligations
- Restrictions on distribution by markets
- Type of fares

It is key that the current distribution agreements are reviewed to ensure that they are not being breached. Restrictions in place must be either renegotiated with the GDS or reflected in the NDC strategy.

Review contracts with 3rd party content providers

- Restrictions on distribution by channels
- Restrictions on distribution by markets
- Restrictions on distribution methods

It is key that the distribution agreements are validated to ensure that they are not being breached. Potential restrictions in place must be either negotiated with the content provider or reflected in the NDC strategy.

Review contracts with other service and data providers. What are the parameters associated to:

- CRM data usage
- Payment gateways and services usage
- Data volumes

Personal data privacy: NDC schemas must make sure that, when a customer's data are shared, it is on a voluntary basis, the customer may be willing to provide more to enable being offered personalized deals. Nevertheless, the subject needs to be carefully looked at, and personal data should not be passed from one stakeholder to another without the subject's knowledge and consent. In addition to personal data, this privacy requirement will also apply to payment details.

Data Privacy and GDPR

Just as is the case with existing distribution processes, distribution based on NDC, or any other means of personalization or shopping with enhanced content, must be compliant with privacy and data protection regulation. On 25 May 2018, the General Data Protection Regulation 2016/679 (GDPR) entered into force. GDPR introduced several major modifications in the privacy landscape. One of the key principles behind the new regulation is to strengthen the protection of individual's data protection rights.

IATA's NDC changes the scope of personal data exchanges during the shopping process and the roles of the parties involved in that process by receiving, transmitting or responding to shopping requests from a traveler/customer. Applicable local laws vary in different jurisdictions around the globe, and may even still vary within the European Union. Any party processing passenger data is advised to consult their own legal counsel for more precise guidance.



Further details on Data Privacy and GDPR can be found in NDC InFocus document '[Data privacy and GDPR in an NDC world.](#)'

Ensure that the various departments understand legal and contractual implications which will affect their business unit:

- Distribution contracts
 - IT contracts
 - Data privacy
 - Payment standards and rules (e.g. PCI-DSS)
-

2.3.6. Project organization / External support needs

This is in addition to the previous chapter, which focused on which department had to be part of the core program.

Define what supporting documentation you might need to help you with the strategical part of NDC

Identify the involved departments and stakeholders in each department (see above)
Clarify expected involvement of stakeholders and corresponding departments. Identify external stakeholders and contact person in each organization.

Create a relationship map (internal + external stakeholders +status (supportive, neutral, opposing, influencer...))

2.3.7. Communication

Communication is extremely important to the success of any large project or program. Having the right communication to the right audience, and just as important, having predictable communications (e.g. update to executives every two months) will not only give everyone involved peace of mind, but also show that things are under control. Prior to the NDC implementation program being initiated, communication is equally as important to build support and momentum, as well as alignment.

Create the key message (benefit, involvement, expectations) for each stakeholder and their department for external communication

Define templates and channels of communication

Ensure that the global strategy is shared

Share the global NDC vision (internal/ external)

Ensure that the distribution strategy is shared and agreed upon

2.3.8. Project metrics and reporting

Define metrics to measure the success of the NDC program and strategy. What are the targets within 1, 3 or 5 years?

- Revenue
- Units (e.g. ancillaries, flights, clicks, etc.)
- Cost to build
- Cost to operate

Is there a reporting mechanism in place to communicate the success of the NDC program and allow this to be related to the business metrics?

2.4. Platform assessment

2.4.1. Matching Platforms to Capabilities

Selecting a vendor NDC platform should not only take the first delivery phase of the program into account (definition of the needs), but the following steps of the NDC roadmap as well – indeed, it is important to select a platform which best supports the airline's entire NDC roadmap. The platform will either be part of the PSS, or developed on top. It can be built in-house (for airlines having for example previously built booking engines for their website) or purchased with 3rd party IT vendors.

At any point in time, each vendor platform/offering will be different (e.g. in terms of functionality support) and these differences will evolve over time. Thus, it is also important to understand vendor roadmaps as well as current offerings.

The following chapter gives further advice for the NDC platform assessment / selection phase.

2.4.2. Completing the Platform Assessment

At this stage, the NDC readiness is nearing completion. The features and functions list has been used to identify the key requirements towards a solution, and perhaps an RFP has been issued or at least high level discussions with various vendors are planned to understand the capabilities of their products and their roadmap.

There are a number of important criteria above and beyond the functional capabilities of the solutions which should be taken into consideration. Some of these are examined below.

NDC Solutions White Paper

A number of IT companies have built solutions to process NDC. Those solutions are available to airlines and enable them to bring new products and offers into the market. As more airlines adopt the standard and IT vendors build solutions, IATA is keen to provide transparency and visibility on how solutions from NDC-certified and -capable suppliers actually comply with the vision of NDC described in resolution 787.

- 2017 marked a tipping point in NDC adoption, with 45 airlines live by year-end, and an increased adoption across travel agencies, 2018 has continued that trend, with 65 airlines live at the time of writing.
- Many IT companies have applied for certification, and it is necessary to include them in the overall analysis of solutions.

The key finding from the report is that IT providers have a clear vision of NDC and its main benefits. IT companies have built solutions designed to reap the full benefits of NDC. They have incorporated in their roadmap a vision to even further facilitate airline distribution transformation, including expanding the scope of offer management and integration with loyalty databases. However, NDC is a long-term journey and there is still a need to further explain the full value of NDC and all potential benefits.

Year after year we can see that NDC solutions are becoming more sophisticated, taking into account new airline expectations such as personalization. IT players also focus more on Order Management.

Another key finding is the growing number of new aggregators, often small-sized companies. Information on what these companies are doing can be found in the NDC Certification Registry.

The IT environment is constantly evolving. IT providers show a good understanding of possible challenges such as managing greater



volumes of data, the complexity to process interline, etc.

The [NDC Solutions White Paper](#) presents aggregated findings. Each IT company remains anonymous. In order to fully benefit from this report, IATA recommends that airlines focus on the core findings and on the methodology. Core findings will bring a valuable understanding of how IT providers have implemented NDC (offer management, rich media, interline, etc.) both on the airline IT side and on the aggregation side. The methodology is presented in the Appendix. It consists of an extensive survey that can be used as a possible starting point in the dialogue between an airline and an IT company.

Vendor type

The question many airlines will need to consider is which type of vendor they would be comfortable working with – a larger company with the typical safety net and access to a large resource/expertise pool, or a small, dynamic company with a more agile approach? Are there language or cultural topics which need to be considered as this will be a long term relationship? Is there a corporate push to reduce the number of supplier relationships, and therefore a need to focus vendor selection on companies with existing relationships: for example, in the PSS or e-commerce domains?

The vendor should always be seen as a long-term partner in this area, as the NDC environment is developing and it is certain that there will be changes on the airline side and within the industry, and the NDC platforms will need to evolve accordingly.

Product roadmap

As stated earlier, the NDC standard, while out of its infancy, will continue to evolve. Indeed, the quality of the standard is improving with each live implementation, and with each task force and working group meeting. This

continuous improvement also means that NDC vendors will need to continually enhance their current products with additional features and functions. A vendor should have a product roadmap to reflect this. How much will be invested and in which areas? Does the vendor have a strategy for its product that aligns with your specific current and future needs? How is the vendor's track record in following roadmaps, investment plans and industry trends? Of importance to an airline may also be which service level agreements will be in place for product and feature delivery, e.g. what will be delivered by when and how robustly?

A review of the vendor roadmap will help align expectations over the next few years and improve the chance of a successful long-term airline / vendor partnership.

Architecture

An architecture should be modular. A modular system leverages existing assets and at the same time allows the addition of best-of-breed functionality as it becomes available. This modularity will allow airlines to respond rapidly to changes in their business environment. It will minimize the impact that changing one process will have on others.

These modular building blocks should support standard interfaces. This will clearly drive development and integration costs down. It should indeed simplify the way IT assets are constructed and operated; and the way they are inter-connected.

One key example for modularity and standard is the portability of the solution in case of PSS change. PSS' position is often central in the architecture of an airline. Since PSS changes are recurrent in the industry, one needs to ensure that the architecture is not PSS dependent. At least, dependencies should be limited or well understood.

One of the direct consequences of applying these two principles will be to transform the airline landscape into a more modular environment – a modular environment where valuable existing assets are leveraged, obsolete assets are renovated, and new assets can be added easily.

Clearly, this can only happen in the context of a framework integrating all these modules in a coherent manner.

When building its architecture, one should not forget a third mandatory asset: scalability. With NDC, the airline systems are now key in distribution flows and manage large volumes of data (shopping, offer management).

Integration capabilities

In the context of a modular landscape, NDC platforms will need to leverage existing integration capabilities or bring their own capabilities.

From a technical perspective, a number of key questions will need answers: e.g. is there already a stand-alone integration in place?

If so, what specific integration scenarios are supported? Which integration scenarios are

required between NDC platforms and supporting systems? Are there standardized API's for these surrounding systems? How much will this integration cost (e.g. in terms of resources, timeline)? What will be the support model for this integration piece? How much volume is expected? Are the interfaces secured? How to minimize unwanted shopping requests e.g. non applicable, robotic phishing? Clearly, these are just a few of the questions to be raised, and this area is best reviewed in detail by the airline's IT department.

Support model

Different support models are available: e.g. from dedicated, local resources to centralized global helpdesk with specific coverage. It is important to discuss within the organization, both business and IT, what type of support coverage is needed. In terms of support model, it may also be useful to separate between two phases: hyper care (in the first months after deployment) – and normal operations (after the hyper care period). The needs for these two phases may well be different.

Within the realm of support, service levels for operations, maintenance and support must be carefully examined and matched to the airline's needs. Understand the support models

As a summary for your NDC Program



Figure 10: Summary of an NDC Program's major steps

the vendor can offer, understand associated costs and ensure that these align with your needs and budget.

As it is also part of the provider support, the airline should also consider its potential needs for (private) developments: how its provider reacts to change requests: what is its time to market? What is the maximum size of changes allowed? What costs are to be expected?

2.5. Certification

In October 2015, IATA launched a certification process for validating the technical capability of actors to deploy all or parts of the NDC standard.

At the AIR Symposium in October 2018, IATA introduced new levels for NDC certification – level 4 and NDC@Scale.

2.5.1. Goals

The goals of NDC certification are to provide transparency for existing NDC deployments, to validate the capability of supporting IT providers, to protect the NDC brand and to support the early adopters of NDC.

Level 4 will include additional servicing messages.

NDC@Scale will be a new area of certification. It will measure 4 dimensions beyond messaging to certify the ability to process volumes of NDC sales against certain criteria:

1. Technical setup
2. Organizational setup
3. Use cases
4. Capabilities

See the next section for more on NDC@Scale.

2.5.2 Scope Levels 2-4

What does the certification measure?

The certification process measures the capability to receive and send NDC messages, from a seller or an airline perspective. It validates specific NDC end-points as opposed to generic products.

Here, IATA certifies the messages, not the underlying architecture and processes or workflows.

Who Can Be Certified on Levels 2-4?

Those who ensure deployment:

- For Airlines: any airlines that deploy an NDC API
- For distributors: any travel agent or aggregator that consumes these APIs
- For those who propose products: any vendor that offers NDC products for airlines and distributors within offer and order management

NDC Certifications, Scope & Levels

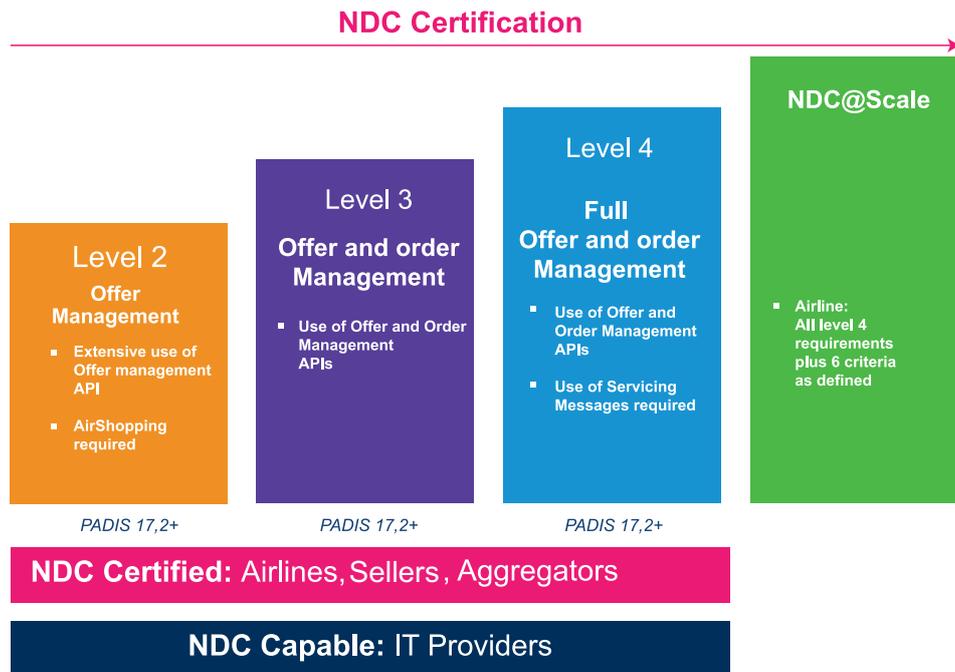


Figure 11: NDC certification scope and levels

Levels and definition:

The diagram above illustrates the 4 levels that IATA will certify.

2.5.3. Certification process

The process is the following:

Step 1: Airlines, Distributors and IT providers apply for certification. They complete the certification form, capture live NDC messages and send the trace and additional supporting documents to IATA.

Step 2: IATA, as the certification authority,

validates the trace, the application and the additional supporting documents.

Step 3: The certification team creates an official notification, the requestor is published as certified on the NDC certification registry, and is given the authorization to use the IATA NDC Certified, NDC Capable or NDC@Scale logo.

2.5.4 Current results

For more details, access the NDC Certification Registry. This page lists the NDC certified airlines and the NDC capable actors.

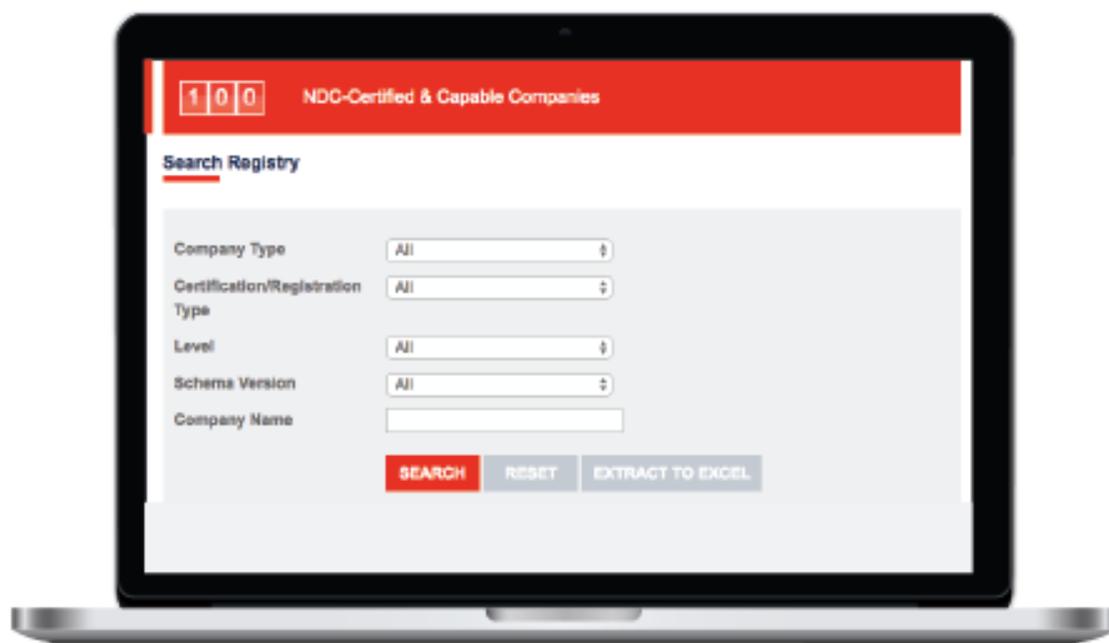


Figure 12: Certification figures – as of October 2018

2.5.5. NDC@Scale

As the NDC standard moves towards industrialization, IATA felt the need to provide transparency, visibility and guidance to the industry. For this purpose, IATA has introduced a new concept called “NDC@Scale.”

NDC@Scale is a set of criteria which will demonstrate that airlines (and their IT providers), aggregators and travel sellers have a recognized capability to work together to drive volumes of NDC transactions.

In conjunction with changes to NDC certification, described elsewhere in this document, IATA commissioned the consulting firm SIA Partners to conduct a survey of some of the key participants across the value chain. The aim of the survey was to better understand the expectations that the NDC stakeholders have of each other to ensure better alignment as we drive toward critical mass.

The following graph summarizes the main findings of the survey around 3 key dimensions:

- Technological challenges
- Business process challenges
- Assessment of NDC capabilities

2.6. NDC Leaderboard Airlines

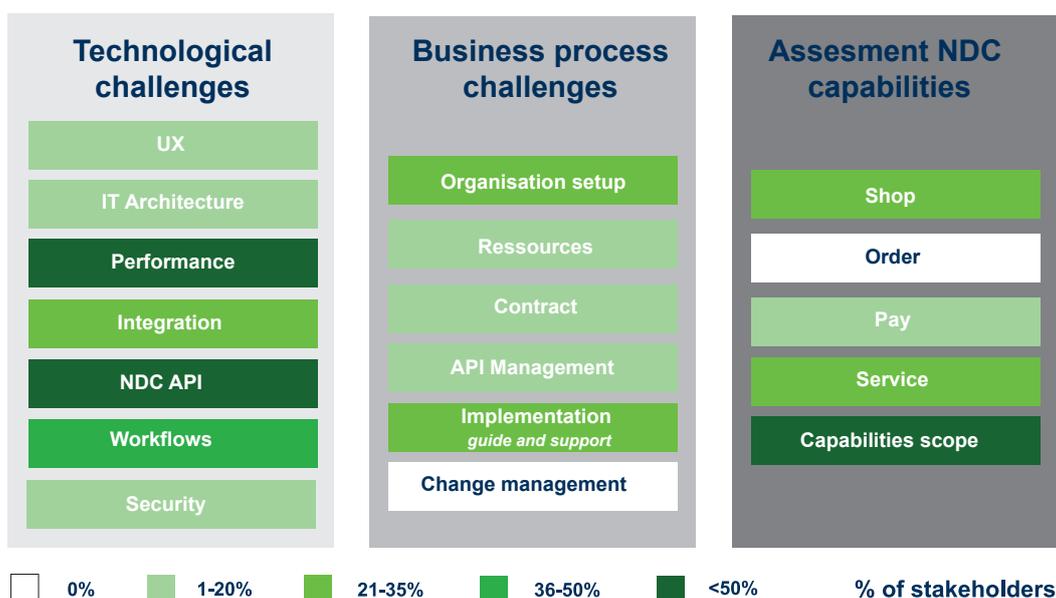
At the IATA World Passenger Symposium in October 2017, IATA announced it was inviting airlines with strong aspirations to grow their NDC volumes rapidly, to join the NDC Leaderboard.

The benefits

IATA will provide support to the Leaderboard on related matters such as payment, architecture, schemas, and workflows. It will also provide greater support in the areas of engagement, adoption, technology and innovation.

IATA will also continue to support all of its other members which choose to adopt NDC. These other airlines will also benefit indirectly from the Leaderboard. The push for critical mass will contribute to a rapid growth of the number of travel agents, corporate buyers and consumers using NDC.

IATA will share implementation roadmaps which will help speed-up subsequent deployments. And finally, the push from the members of the NDC Leaderboard will help IT players to enhance their solutions and trigger innovation from new entrants– which will increase competition and speed to market for the followers.



More detail on the key findings and challenges identified for scaling an airlines NDC implementation, can be found in the White Paper - [NDC@Scale: Roadmap to Critical Mass](#)

3. Towards an Enhanced and Simplified Airline Distribution

NDC can now be seen as the first step in the ongoing modernization of a 40-year-old ecosystem (messages, workflow, architecture...) The whole industry is changing to improve its existing features, copy/pasted from a paper based industry, and adjusting them to our web based world.

Next step is ONE Order, and more steps are to be expected.

3.1. ONE Order: an additional step forward

As far as Order Management is concerned,

NDC covers from booking to issuance of accountable documents (ET/EMD).

ONE Order goes further by transforming the Order into the only reference any stakeholder of the industry needs when it comes to a customer journey.

ONE Order modernizes the order, delivery and accounting processes beyond today's ET/EMD and PNRs/SSRs. It replaces the current booking and ticketing records and combines the content of those into a single retail and customer focused Order. All entities involved in travel and fulfilment, from the customer to the third-party service providers, will access the

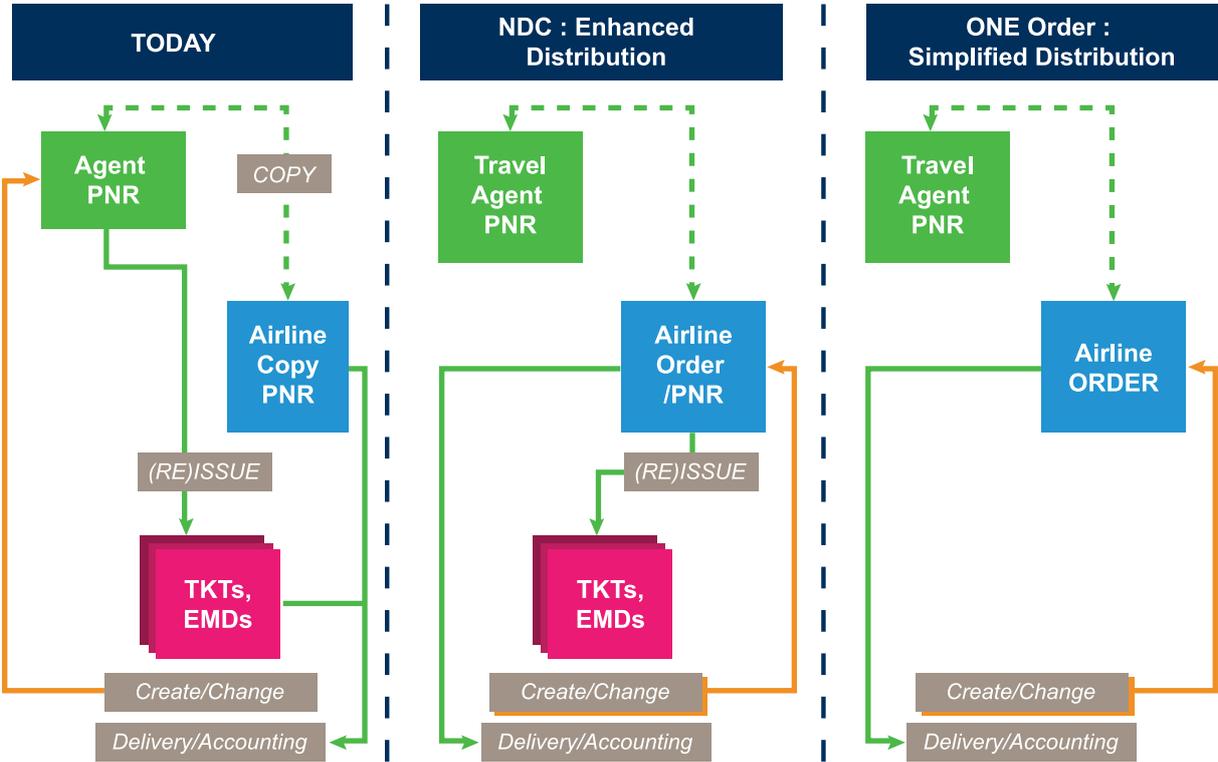


Figure 13: From current situation to ONE Order

single record to get the required insight and make necessary updates to any given trip.

The table below clarifies the ONE Order Program scope against NDC's and lists the additional benefits it brings to indirect distribution.

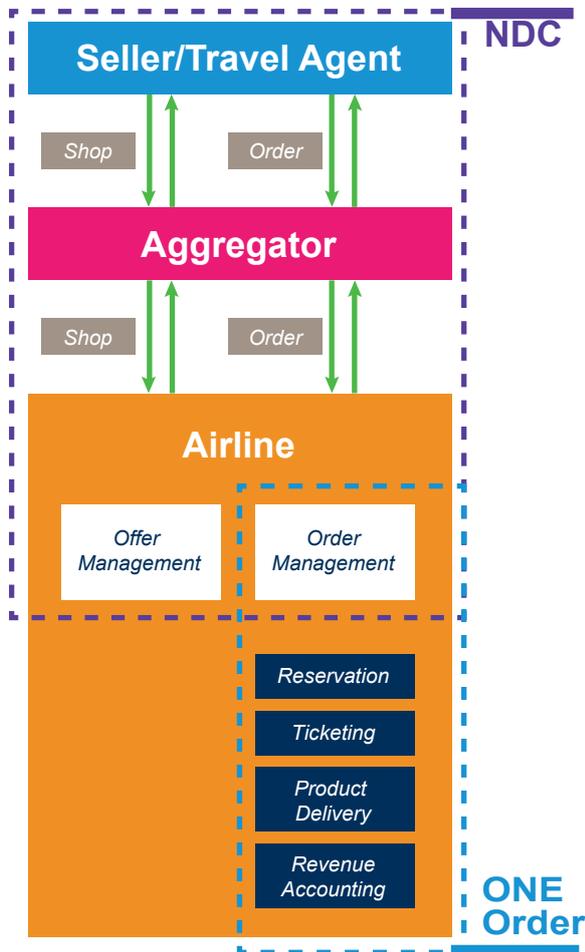


Figure 14: NDC and ONE Order scope in Indirect Distribution

ONE Order Simplifies Distribution:

- Sets the Order as the only Customer Reference/Receipt for any stakeholder
- Disposes of ticketing processes and avoid out of sync documents
- Standardizes retailing solutions
- Facilitates interlining with ticketless carriers
- Allows lighter Revenue Accounting

Completing NDC, One Order also supports simplified processes for the direct channel, particularly in interline scenarios.

3.2. NDC and “ONE Order” Order Management architecture model

The overall end state architecture for NDC and ONE Order foresees an offer management component, an order management component and a unifying integration layer through which conversations with external systems, partners and parties are held. The offer and order management capabilities may be delivered from a single system, or from different systems.

The Order Management System allows airlines to retail core flight and flight ancillary products with non-air ancillary products such as hotels, cars, trains and products and services from third parties.

At the core, the Order Management System plays the role currently covered by the reservations modules of a standard PSS. It manages the reservation and ticketing-related processes with order records as opposed to PNRs, ETKTs and EMDs. Ultimately, the Order Management System will allow airlines to retail core flight and flight ancillary products.



Settlement via BSP/ARC not covered in these illustrations.

3.3. ONE Order Program Roadmap

In October 2016, the Joint Passenger Service Conference approved the ONE Order Resolution (797), thus giving the industry the framework to perform the standard development.

Since then, various task force meetings have taken place, with many stakeholders from the industry: Airlines, IT providers and GDSs. The

expected outcome of those meetings is definition and development of specific ONE Order messages to complete NDC's.

ONE Order standard messages focus on delivery and accounting: they are to be used for exchanges between the Airline and its Interline Partners, 3rd Party Delivery Providers (DCS, Ground Handlers or others), and Accounting Systems.



Figure 15: Key Dates for ONE Order

3.4. Transitioning to ONE Order

ONE Order has great potential to drive incremental revenues and lower costs. In particular, a ONE Order rollout considerably increases the business case for implementing NDC Order Management and achieving its back-office simplification benefits.

The transition to ONE Order is a large scale transformation project of which the cost and resulting return on investment must be evaluated individually for each airline. It also requires close cooperation with industry partners.

In any case, it is likely to allow a real technology refresh for any airline or system provider willing to go down that path.

As a disruptive change, it will require strong internal support, as benefits and drawbacks are obviously very different from one department to another (see table below).

the complexity generated from a historically paper based industry. Together, those industry transformation projects are putting in place the long term framework of Enhanced & Simplified Airline Distribution.

Transforming Distribution is a long term path for Airlines. Ancillaries and rich content are only the first benefits from a first step.

Innovative features are becoming reality using first NDC (dynamic pricing, personalization) and soon ONE Order (Unique reference for traveler, retailing Order Management solutions, lighter revenue accounting).

Inherited structures from the past, that seem deeply attached to Airlines distribution are likely to evolve (Payment, Revenue Management Systems, Passenger Service Systems) or even could disappear (Booking Classes). It is useful to benchmark airline industry to other industries and identify the heavy influence of legacy processes and systems, and the challenge to adapt them.

	Sales	Strategy	Finances	IT
Benefits	Enhance customer service and simplified processes	Industry Game changer and improved interlining	Standardized retailing and accounting processes	Technology refresh
Drawbacks	Long timeline	Industry dependent	Legacy mindset	Complex transition

3.5. Going beyond Enhanced and Simplified Airline Distribution

NDC is becoming a true Transformational project. It will impact a significant number of airline functions as well as the entire value chain, from both a technical and commercial point of view.

While NDC is increasing airline control and flexibility, ONE Order is substantially reducing

3.6 The Order Group

Industry standard-setting activities are one of IATA's core functions. To ensure an appropriate approach to building the ONE Order standard, the Orders Group has been established. It is currently reporting to the Passenger Distribution Management Group (PDMG) of the Passenger Services Conference (PSC). Participants include airlines and multiple system providers for PSS, ecommerce, DCS, revenue accounting, etc.

The Order Group is the “business owner” of Order Management processes and all related standards, from data exchange to expected behaviors and processes.

More information can be found at www.iata.org/oneorder in the One Order Program strategy Paper and also under the subsection “Developing Standards”

3.7. Dynamic Offer Creation

As a perishable asset, each individual airline's seats require meticulous inventory control. The airline industry pioneered Pricing and Revenue Management techniques as early as the 1980s. However, within our industry, the amount that a consumer pays for a flight is still calculated by applying predetermined static price points to limited allocations of inventory using a small number of booking classes. What was innovative and new in the 1980s has long been overtaken by the digital revolution. Running separate inventory and pricing processes creates significant duplication of effort, and lost value for airlines and consumers.

In today's environment where airlines want to offer more relevant bundled products, effective revenue management cannot occur until airlines stop separately managing inventory and price, and start employing the concept of Dynamic Offer Creation.

Many aspects of existing Revenue Management systems (such as the forecaster and optimizers that calculate bid prices) may already be fit for purpose to drive Dynamic Offer Creation. For the remaining aspects of the revenue management equation, a vast new array of data sources and sophisticated algorithms can be used to optimize results: Dynamic Offer Creation allows for an enhancement of airline revenue management functions. Perceived obstacles to achieve this concept, such as regulatory or commercial

requirements, can be resolved with business-rules in a Dynamic Offers engine. As in any transformation project, the main challenge will involve managing the transition, demonstrating the return on investment, and effecting a mindset change.

While there may be opportunities to enhance existing inventory and published fare based systems and processes, to make these more “dynamic”, it is suggested that airlines should look further ahead. The future is closer than it may appear. In the context of the massive industry modernization driven by IATA's New Distribution Capability (NDC) and ONE Order programs, the airline industry is at a cross road. Investment in current systems and processes that entrench inventory and published fare-based processes may divert industry resources and attention from the desired end-state.

Some key factors to consider when looking to implement dynamic offer creation are:

- Merging the functions of inventory control and price e.g. continuous price points and contextualized and relevant offers
- Looking at the impact of dynamic offer creation on airline revenue management
- How to make dynamic offer creation a reality

For further information, see the [IATA White Paper on Dynamic Offer Creation](#).



4. Conclusion

The 7th version of the NDC industry standards is now available, and NDC is now becoming mainstream.

With this guide, IATA hopes to help all airlines prepare to take full advantage of the benefits NDC will bring.

And what comes next?

The pace of innovation is increasing and should continue to impact airline distribution. All new technologies are potential candidates to be included in airline's strategic roadmaps. Are new players (large retail companies from the US or China), or social media, going to redefine the way distribution works?

Models are emerging, based upon AI, Chatbot, and NDC is often behind as a facilitator. More sophisticated payment solutions will be needed, like face or vocal recognition. NDC is creating a "mindset" for change. The journey is only starting!

5. Annexes

5.1. Annexe 1 : IATA resources

As indicated in the guide, IATA has produced Tool Kit and various documents to help NDC Implementations. Here are the various references

5.1.1. General NDC related information

WHAT	WHERE	NOTES
NDC Solution White paper	www.iata.org/ndc then select 'Info' tab	Overview of IT solutions using the NDC standard. Details on suppliers available at NDC Solutions ID Cards.
Taking the Reins	www.iata.org/ndc then select 'Info' tab	The story of how passionate Travel Managers created a vision of the future of business travel aviation in NDC.
Time to Fly	www.iata.org/ndc then select 'Info' tab	Travel managers' views of the TMC value proposition in a new distribution landscape.
TMC IT Architecture	www.iata.org/ndc then select 'Info' tab	A voluntary framework for TMCs to build a modular TMC IT infrastructure.
NDC within IATA	www.iata.org/ndc	Various content and links to training, NDC videos, standards, governance, etc.
NDC Pilots Year End Reports	www.iata.org/ndc then select 'Players' from the tabs	Pilot reports are available for 2013, 2014 and 2015 and 2016 as PDFs.
Certification Registry	www.iata.org/ndc-registry	Updated details on NDC certified airlines, NDC capable IT providers.
AirTechZone	https://airtechzone.iata.org	NDC Developers support site.



5.1.2. Reference supports

1. Implementation guide :

This document provides clarifications and explanations of the concepts and scope underpinning the New Distribution Capability (NDC).

It is intended for business, operations and technology individuals considering or actually involved in the implementation of systems and processes that will utilize NDC standards, whether they be an Airline, Aggregator, Seller or travel Management Company.

Please find out more on www.iata.org/ndc

2. Certification page

To go further with certification (as explained, all related documents concerning the certification (including the actual form for applying))

www.iata.org/ndc - then select 'Certification' tab

5.1.3. Reference for developers:

NDC schemas

www.iata.org/ndc then select
'Standard' from the tabs

AirTechZone

To establish a clear channel for NDC Implementers to ask questions, share experiences, gain insights on common implementation practices on a business, data and technical level, IATA set up a dedicated website AIRTechZone. In addition, developers can also access Sandboxes for testing, message samples including JSON, JSON to XML conversion tools, implementation guide, XML schemas etc.

<https://airtechzone.iata.org/>



