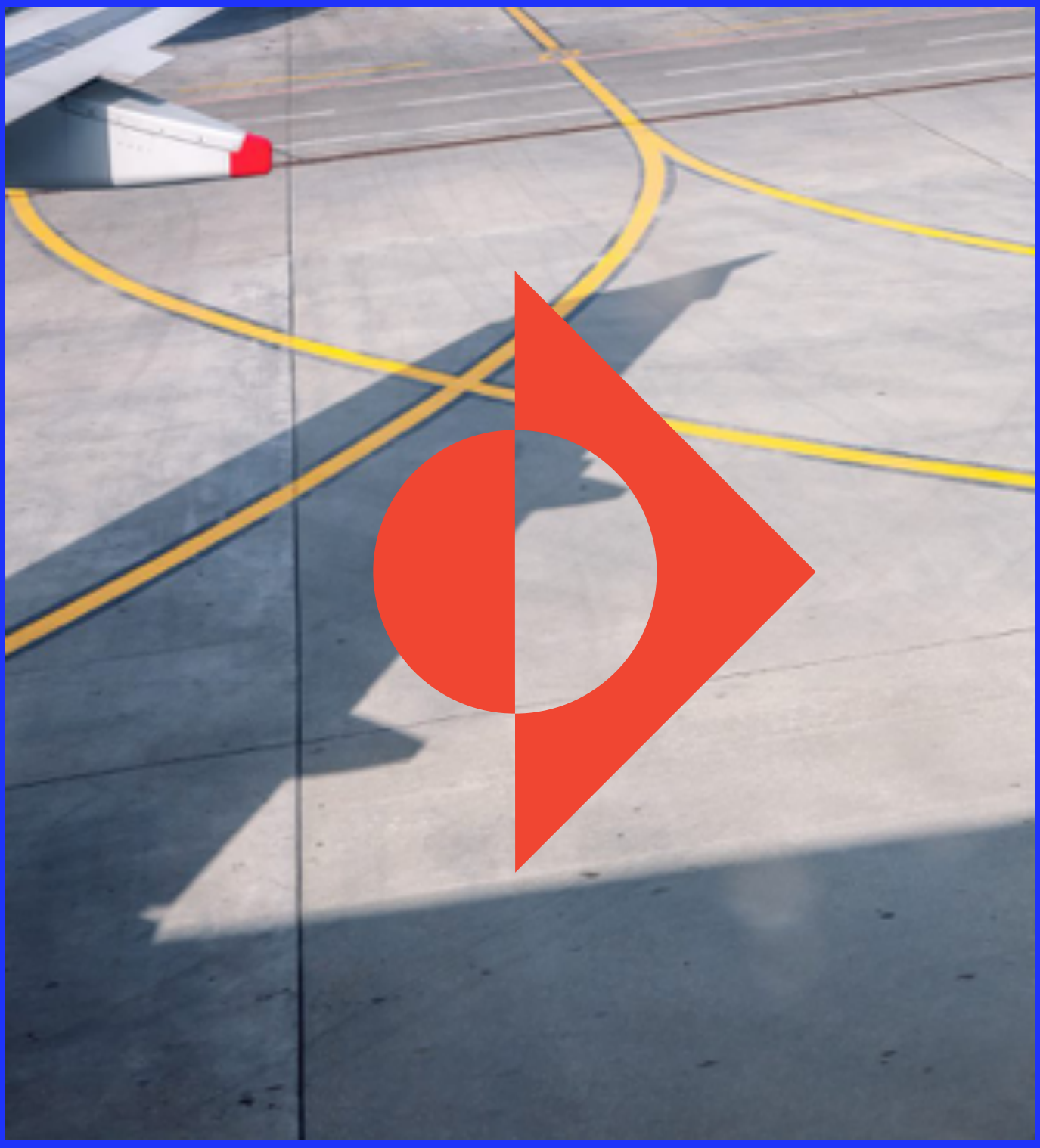
Get Started with NDC



Content

Objective of the document

This guide aims to support airlines in planning their NDC enablement. From defining strategy and objectives 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.

General Structure

This handbook consists of two main parts.

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 steps to be taken in order to start an NDC project.

Following the main content, you will find annexes of checklists and additional, useful information.

How to use this guide

DISCLAIMER

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.

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 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 NDC implementation project.

This guide should be used by the airline with care and diligence, and always in light of the respective environment, and in accordance with any regulatory requirements that needs to be considered.

Part 1: Introduction – NDC in a nutshell

What is NDC?

Airlines are evolving from being commodity suppliers to becoming modern digital retailers. To support this transition, a new data communication standard has been developed to enable airlines to distribute their products through the indirect sales channel in the same way they do in the case of direct sales. In an increasingly digital world, airline customers' expectations for personalized offers, real-time information and seamless transactions are growing.

New Distribution Capability (**NDC**) is a travel industry-supported program launched by IATA for the development and market adoption of this new, XML-based data transmission standard. The industry initiative is aimed to modernize the way air products are retailed to travel agents, corporations and travellers. The NDC Standard enhances the capability of communications between airlines and travel agents and is open to any third party to implement and use.

NDC is in effect the modernization of 40-year-old data exchange standards for ticket distribution developed before the Internet was invented. The initiative started in a rapidly changing industry environment, as an answer to three main trends in the airline industry, aiming to align channels and provide transparent distribution.

Trend 1 - Customer Expectations
The industry today serves a dramatically different base of passengers who have greater expectations about their air retailing experiences.

Trend 2 - New Airline Distribution Capabilities
Airlines have heavily invested in technology and are getting ready to better manage their own Offer and its distribution. New airline distribution capabilities put pressure on the environment of indirect sales, challenging the customer experience to be imbalanced. There is a need to incorporate and interact with scores of new technologies.

Trend 3 - Changes in the Travel Agency Landscape
Travel agencies use a diverse mix of channels to book clients' flights. As airlines have evolved what they sell and how they sell it, agents have adjusted. The travel agency community is also evolving to

adapt to new customer needs, facilitated by modern technologies (big data, servicing, complex sourcing, mobile solutions, etc.)

More information on the evolving trends in airline distribution can be found in the NDC Future Airline Distribution Report on the IATA website.

Why NDC?

NDC enables the travel industry to transform the way air products are retailed to corporations, leisure and business travellers, by addressing the industry's current distribution limitations

- Product differentiation and time-to-market
- Access to full and rich air content and
- A transparent shopping experience

Those benefitting from NDC are

- Full service & low-cost airlines
- Aggregators and travel agents
- Corporate buyers and travellers

They are benefitting from NDC in the following ways

FULL SERVICE & LOW-COST AIRLINES

Differentiate their Products and Services

• Distribute the entirety of the airline's product portfolio, including ancillaries and promotional fares
• Present the airline's products in an attractive manner, using rich format like photos and videos
• Expand the amount of information available on each product: attributes, facilities, policies, passenger reviews, etc.
• Offer value-added products and services when applicable

AGGREGATORS & TRAVEL AGENTS

Access Full and Rich Air Content of the Airlines

• Access to the entirety of the airline's product portfolio, including ancillaries and promotional fares
• Work with real-time fare, product and policies information
• Deliver improved comparison capability to customers, based on product and service rather than price only
• Provide personalized service based on customers' full travel history and preferences, if they chose to be recognized

CORPORATE BUYERS & TRAVELERS

Benefit from a Transparent Shopping Experience

• Make all airline product and service information available to corporate buyers, reducing the need for out-of-policy bookings
• View and compare all air transport options and relevant fares available
• Select the most appealing travel option based on preferences which might range from product quality, service level to schedule and/or price
• Receive personalized Offers from preferred resellers based on own and complete travel history and preferences

The key revenue drivers emerging from NDC are
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, that may drive "up sells".
Ancillaries: displaying additional products (e.g. lounge access) that may drive purchase decision.
Dynamic Pricing: optimizing revenue realization through intelligence, working with modern Offer Management.
Personalized offers: enhancing loyalty with personalized Offers (e.g. Offer Management System connects to the Frequent Flyer database to enhance an Offer by tier or service experience) or pricing based on historical purchases.
Rich content: inspiring through pictures, videos, virtual reality, augmented reality, etc.
Increasing reach: tapping new sales channels both geographically and digitally.

The key cost drivers are
Cost effectiveness: moving from a 40-year old legacy infrastructure to an internet environment will speed delivery of software changes and reduce development costs.
Competition: NDC should facilitate new entrants, which should increase competition and drive down costs.
Process efficiencies: NDC provides the airline with cost reduction opportunities in the areas of ticketing, payment and revenue accounting and back-office in general.
Audit efficiencies: NDC improves revenue integrity (eliminating most of costs to manage fare auditing), which should reduce the number of agency debit memos (**ADM**) issued.
Payment efficiencies: NDC brings the opportunity for airlines to have a better management of their payment strategy and the resulting costs. An airline should be able to create products and associate them to their preferred/more convenient payment method.
Reducing revenue leakage: performing real time checks in the BSP (IATA Billing and Settlement Plan) on travel agency sales, should cut revenue losses from agency defaults, pricing mistakes etc.

What is in Scope for the NDC Standard?

Structured around key functional domains, the NDC standard provides the opportunity to address the end-to-end airline distribution process - from shopping and Order Management to delivering enhanced customer experiences.

Some features include

- The NDC Offer and the NDC Order to support airline retailing
- Capabilities for an airline to easily distribute catalogue-style ancillary services
- Capability to render a seat map and sell seats and related ancillaries using the Offer structure
- Ability for a customer or seller to view the simulation of their intended change to an Order before the actual confirmation with the airline
- Enhancements to support regulatory requirements.

- Ongoing technical enhancements for continuous improvement and to deliver an even more robust standard

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 third party, such as a travel agent, and triggers an Offer creation from an airline, depending on the items contained by the request. The Offer is then proposed to third party.

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 holding an agreement with an airline.

As it is creating the offer in its own IT environment, the airline is in a position to introduce new pricing mechanisms. Dynamic pricing is very likely to be widely implemented over the next years, as it addresses current pricing limitations. Instead of allocating a limited number of price points per bucket (e.g. 26 alpha codes), airlines will create many more price points. This is called 'indefinite price curve'.

Order Management

Order Management is the ability for the airline to create, store and manage its Orders. It can be as simple as ensuring that the Passenger Number References (**PNR**), E-tickets (**ET**) and Electronic Miscellaneous Documents (**EMD**) are referenced with a single identifier, i.e. an Order ID. In a more sophisticated system, Order Management could be similar to the retail world where every aspect of the Order, from product purchase to delivery, is managed.

An Order is a uniquely identified record of the agreement between two parties 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 related to a flight (e.g. subscription services).

Note: Order Management features could be extended to cover the entire lifecycle, beyond fulfilment, to delivery and accounting which typically occurs offline. This logical extension is one of the aspects of the purpose of the ONE Order Program.

For more information, visit the ONE Order pages on the IATA website.

Evolution of the NDC Standard

As with any standard, NDC has evolved to take account of the changing environment (e.g. PSD2 changes, evolving payment methods, etc.) as well as to refine existing messages and processes.

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 download XML schemas, use Sandboxes for testing, find message samples including JSON, JSON to XML conversion tools, implementation guide, etc.

More information on the changes made to the original NDC standard can be found in NDC in-focus highlights of 17.2 to 19.1, and actioned change requests are recorded in the distribution implementation guide on AIR Tech Zone website – the NDC developers support site.

Changes to Key Processes

NDC, like all IATA standards, is an open standard available to all. NDC will unlock value through the travel agent channel by providing it with features and content that is difficult to access today. The key processes changing are listed below.

Shopping, booking and ticketing (Offer and Order)

With the implementation of NDC, the high-level distribution and sales processes 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 three major shifts

- The airline receives requests and creates the Offer
- The airline is the full owner of the master Order that contains the latest information
- The airline processes payment and issues the travel document, advising the references to the travel agent

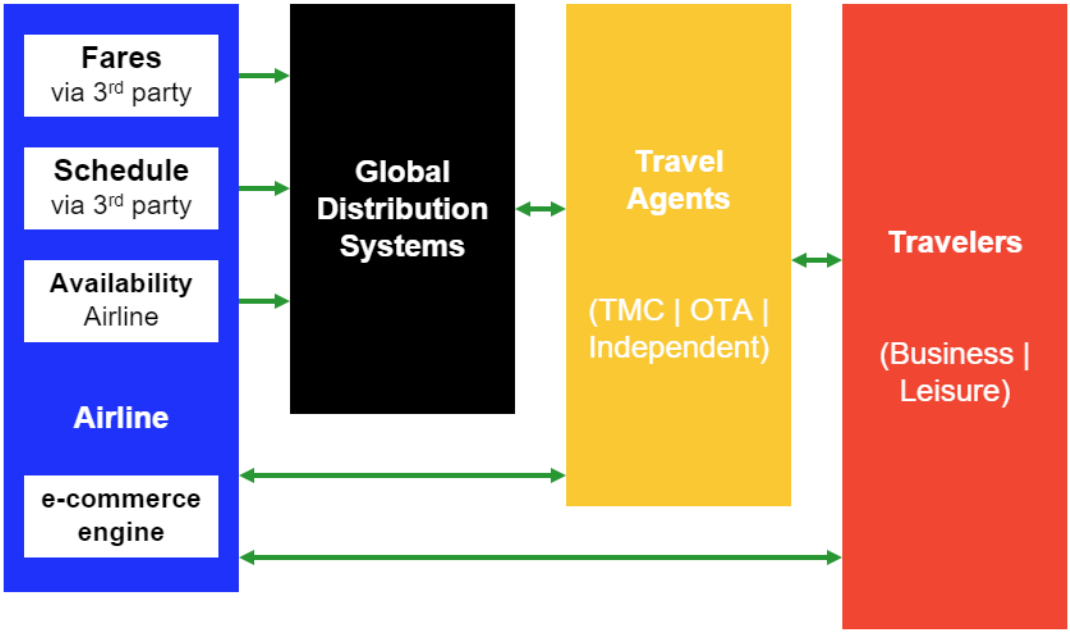


Figure 1.0: Indirect flight distribution before NDC

Figure 1.0 illustrates how shopping for flights and booking/ticketing worked before NDC.

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 travel agent, the airline only owning a (partial) copy. The airline is unaware of the end customer who is shopping until the transaction has been completed. The ticket and any miscellaneous documents are issued from the GDS.

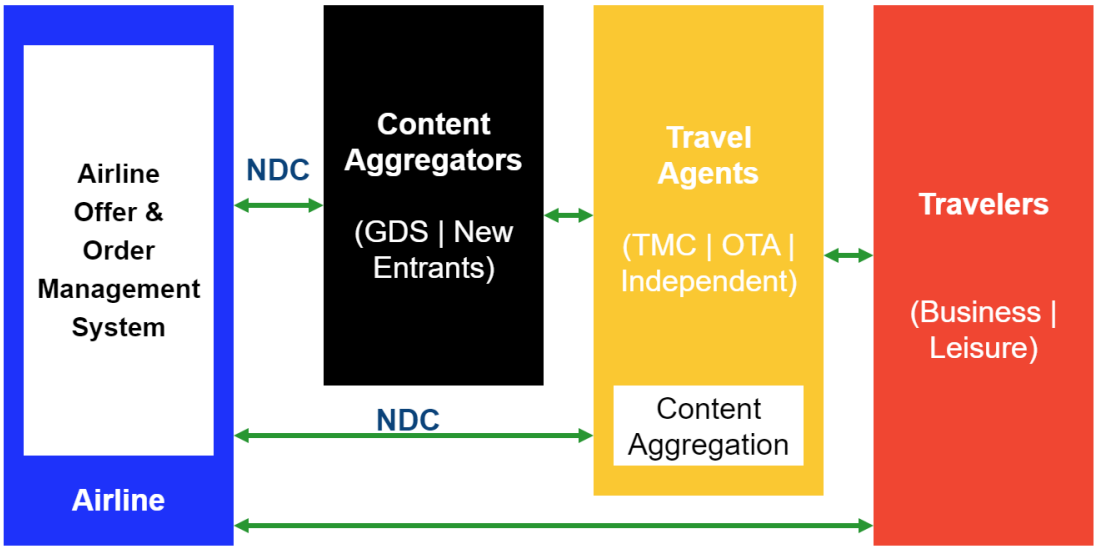


Figure 1.1: Indirect flight distribution with NDC

As Figure 1.1 illustrates, the aggregator transmits the information (i.e. the request and later the Offer) and is not a part of the Offer creation.

The concept of aggregation is a key component to NDC-based distribution. It has three core functions

- 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 an *airline profile,* maintained by a Profile Distributor, to determine which airlines to send an Offer request to. With their own airline profile, airlines can 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.

Payment

In the NDC environment, the 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 an Order (PNR and ET). In addition to its role as the contractual party to the transaction, the airline is in a better position to manage payments as it can accept or refuse a specific card and process all fraud detection as done in the case of direct sales.

Before NDC, the travel agent would either collect the money and settle it through the IATA provided Billing and Settlement Plan (**BSP**) or use a Global Distribution System (**GDS**) for payment authorization and credit card payment to the airline bank.

With NDC, the airline becomes the merchant processing payment. Potential benefits could include:Lower fraud costs

- Lower cost of payment (both in terms of internal processing costs and merchant fees)
- Increase the number of payment methods accepted; and possibly tailor-made by country and customer
- Expand customer base through additional payment options

Airlines have the opportunity to apply their complete portfolio of payment instruments to indirect distribution, such as Pay Pal, bank transfer, pay by instalment, air miles, etc. An airline choses payment instrument based upon factors such as cost of payment, cash flow, risk of fraud and geographic reach. The list of payment instruments is growing fast, due to the dynamism of the FinTech community.

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

For more detailed information, see NDC InFocus - Payment located on the IATA webpage.

Billing and Settlement Plan Reporting

In an NDC environment, the airline is in control of the Offer and Order Management as well as the issuance of an NDC transaction. This means a change from the non-NDC environment where a GDS reports a sale to the BSP. In this environment, the BSP is responsible for cash collection from agents, payment of commissions and preparation of card remittance files for the ticketing airline.

With NDC, the airline will benefit from the BSP and its enhanced value proposition through

- Access to an industry distribution framework composed of a reliable and professional network of agents in approx. 180 countries and territories
- A single standard reporting and settlement process available for airlines and their appointed agents
- Improved BSP risk management functionalities
- 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 and NDC InFocus – BSP for NDC located on the IATA webpage.

Interlining

The IATA interline process is an important foundation of the airline industry, allowing passengers to buy one ticket for a travel route including different airlines for a seamless airport experience.

In a non-NDC world of indirect distribution, the GDS constructs interline itineraries involving two or more carriers, and applies filed fares. In this model, each participating carrier typically have little control of the revenue they expect. Each carrier is only able to calculate their share of the revenue when they receive the full ticketing information, which may be at the time the flight departs.

In an NDC world, while creating its Offer, the airline may include the services of other airlines. The initiating airline will be responsible for obtaining content from its own interline partners. The airline

would send a shopping request to chosen partners and receive Offers in return. 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 interline partners. The complete Offer is sent back to the travel agent. If the Offer is booked and paid, the airline issues its own accountable documents and collects the money. This should lead to fewer disputes between airlines during settlement as all parties will be aware at time of sale as to their share of the sale revenues.

Servicing

Servicing refers to changes to a customer's Order, triggered by the customer or by the airline. Upon a request to change an Order, the travel agent will make the transaction in the airline environment instead of through the GDS.

Changes triggered by the customer are also referred to as voluntary servicing, such as a change of flight date, adding an ancillary or cancelling a trip. At the core of NDC is the principle that the airline is in control of its distribution. The Orders can be made in the airline IT environment even though they are accessible to travel agents. The process will be seamless for the travel agent.

Changes triggered by an airline are also referred to as involuntary servicing, such as a flight delay or cancellation due to weather conditions, not delivering an ancillary due to changing aircraft or a time change causing a misconnection. Involuntary servicing involves advising the travel agent of the change so they can manage the impact to their customer.

Servicing may be looked at through 2 broad lenses described below - the standard, and the implementation.

- The standard supports airlines implementing servicing scenarios with their partners from version 17.2 onwards.
- Servicing must be implemented by the airline and their agent partners, and supported by other parties that may be a part of the servicing flow. These parties include aggregators, mid/back office service providers and delivery service providers among others.

For more detailed information, see NDC InFocus - Servicing located on the IATA webpage.

NDC Adoption Status

To enable NDC to deliver maximum benefits to airlines, travel agents and customers in the least amount of time, the IATA Board of Governors decided at the end of 2017 to target a critical mass of volume of transactions. Therefore, the focus of the NDC program moved from capability to promoting critical mass adoption from 1 Jan 2018 to 31 Dec 2020. The long-term vision is mass adoption in 2025.

The proposed approach to reach critical mass is as follows: IATA invited airlines which want to grow their NDC volumes rapidly to join a group called the Leaderboard. These airlines each have an individual goal that will consist of having at least 20% of their sales powered by an NDC API by 2020. The leaderboard is currently comprised of 21 airlines that carryover 30% of IATA passenger volumes.

Figure 1.2: NDC Leaderboard Airlines

NDC Adoption Tools

NDC Matchmaker

The NDC Matchmaker is a free web-based tool bringing more visibility to all value chain stakeholders that are working together on NDC implementations. The Matchmaker enables airlines, travel sellers and aggregators to search, compare and connect with NDC partners. It increases transparency of their NDC capabilities and facilitates cooperation among different participants in the travel value chain.

The NDC Matchmaker already features more than 140 NDC connections between airlines and their travel seller partners. Participants can display their NDC content and partnerships and be searched by category as airlines/sellers/aggregators; by type of products and services available; or by country.

Read more about the NDC Matchmaker on the IATA website.

NDC Certification

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, to support the early adopters of NDC, and to accelerate NDC adoption. The certification process examines the capabilities of airlines, agents and aggregators to receive and send NDC messages, testing specific NDC solutions.

Level 2 - 4

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.

Those certification levels are available for the following:

- Airlines - any airlines that deploy an NDC API.
- Distributors - any travel agent or aggregator that consumes these APIs.
- IT Providers - any vendor that offers NDC products for airlines and distributors within the Offer and Order Management scope.

NDC@Scale

To support the journey to critical mass, IATA introduced NDC@Scale, a new certification label to recognize capabilities to drive volumes of NDC transactions. This certification measures 4 dimensions beyond messaging to certify the ability to process volumes of NDC sales against certain criteria:

- Technical set-up
- Organizational set-up
- Use cases
- Capabilities

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

The illustration below demonstrates the levels that IATA will certify.

Figure 1.3: Scope and levels of NDC certification

Read more about NDC Certification Program on the IATA website.

To see who are the NDC certified actors and to learn more about the certification process, access the NDC Certification Registry on the IATA websites.

NDC Milestones

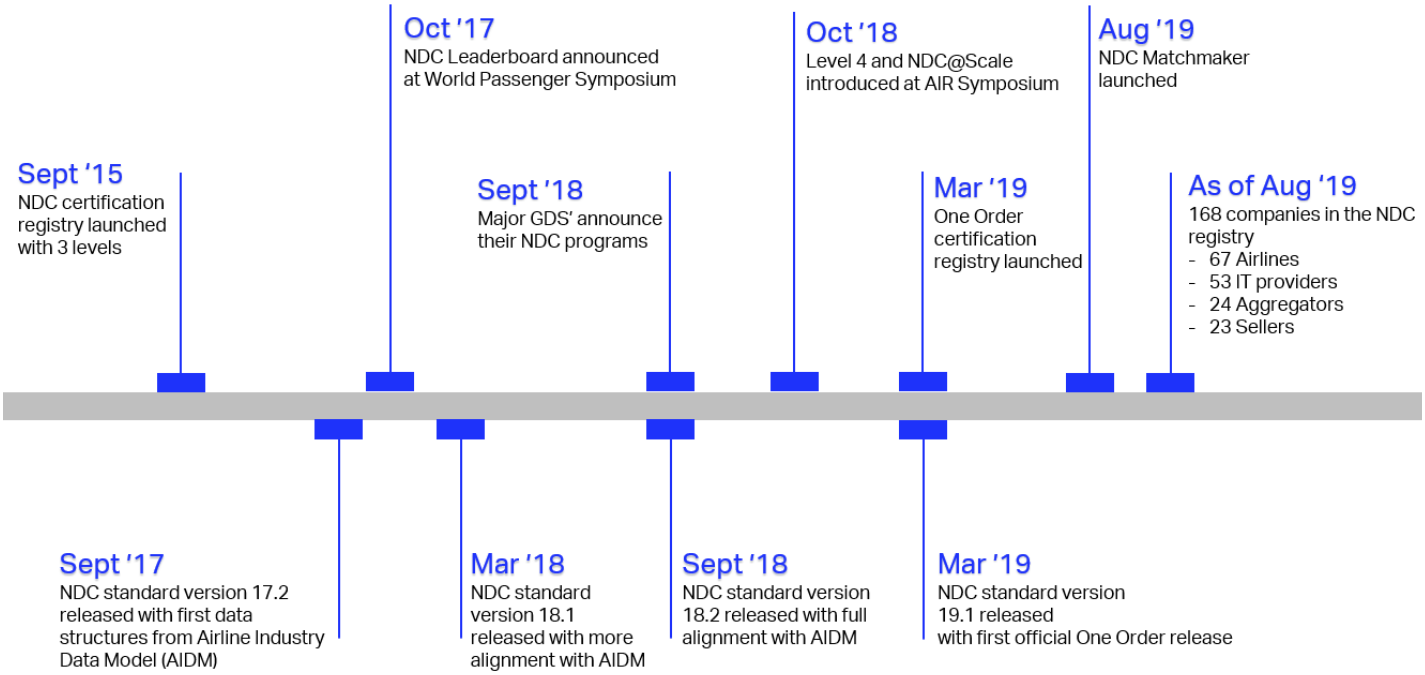


Figure 1.4: NDC Milestones

Part 2: Getting started with your NDC adoption

Roadmap

The NDC roadmap below illustrates the different subjects that are covered in part 2. The goal is to enable direct navigation to a subject of interest, in addition to giving a general overview of important aspects of NDC preparation.

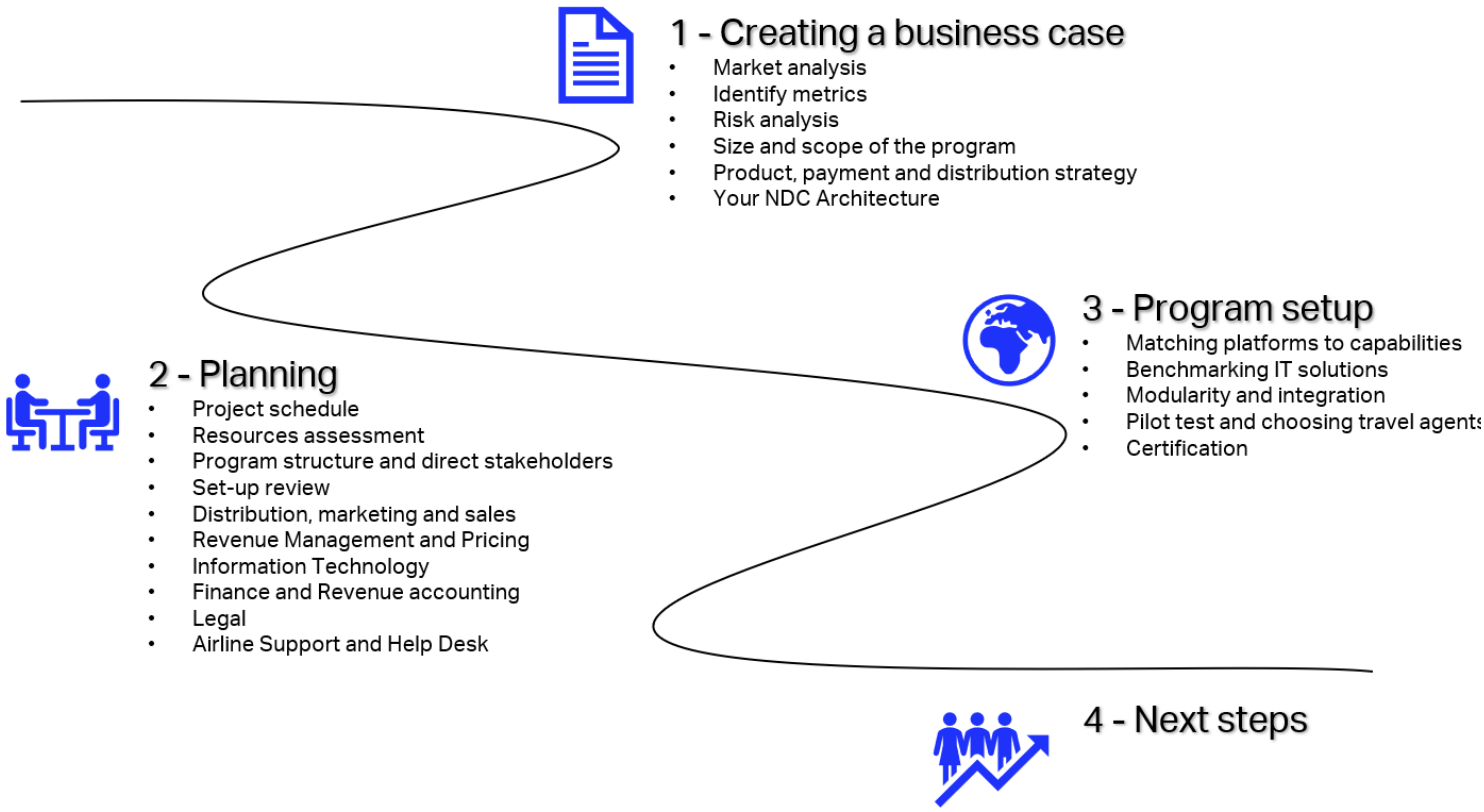


Figure 2.0: The NDC Roadmap

Pre considerations

Prior to building the business case, several considerations should be made. To begin with, it is important to brainstorm how the airline could exploit the opportunities NDC has to Offer and start defining a **strategy** (see checklist 2.0). This should be done in light of the airline's **contractual situation**. Both the commercial contracts with distribution partners, as well as contracts with Passenger Service Systems (**PSS**) and other IT system providers must be reviewed at an early stage to measure constraints, and potential costs associated with them.

One early step will also be to determine the appropriate program **approach**. When breaking the program into small sub-projects, the airline will need to decide what it is ready to take on, and how. 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. Certain first-movers have found that a *product management* approach is more fruitful than a *project management* approach. In the end, NDC might be better explained and managed as a product rather than a project.

If the airline decides on a product management approach, an **agile methodology** might be a good choice. Here, the airline's priorities will be a key factor to determine. The longer the NDC implementation project, the more changes are likely to happen in the interior/exterior environment, and therefore minimum viable products (**MVP**) should come first. An agile framework is based on 2-3-week sprints where features are developed and implemented one by one, making the definition phase and product development phase closer together. Change can therefore be managed dynamically.

An alternative approach to manage your NDC program is a so-called **waterfall methodology**, which is a traditional way of project management. Here, the NDC development is scoped in its entirety in the beginning.

Another meaningful consideration is the airline's process for soliciting proposals from external software or hardware providers. The Request for Proposal (**RFP**) process may be conducted at the very beginning of the program or after the business case is approved. Criteria applicable to platform assessment is discussed in Step 3.

The preferred **distribution channel strategy** is also important to investigate prior to building a business case. Which channels will your NDC strategy address, and in which order? What is the value derived from each channel option? (see more on distribution strategy further below).

Step 1: Creating a business case

Business case principles

A Business Case can be defined as *a document or presentation in which you compare multiple alternatives and propose a single course of action that creates the most value*. In order to get the **buy-in** needed to implement NDC with success, a business case for presentation can be very helpful.

Before creating a business case, it will be worthwhile to investigate how your organization reviews and approves initiatives. It is also recommended to **identify decision makers and other stakeholders** that will be significant during the project lifecycle, which will be further explained in Step 2.

A **market analysis** may be undertaken to assess the potential revenue growth or cost savings that the airline can expect to achieve. This could involve surveying agents to determine their appetite for new NDC offerings and using the NDC Matchmaker (see part 1) to view current connectivity between parties and live capabilities in the air retailing market.

The airline could also conduct a **financial simulation** to compare realized benefits achieved through direct sales to potential benefits through indirect sales (e.g. an airline obtains 40% of revenues through direct sales and 60% through indirect sales). Of direct sales 1 in 10 transactions result in the sale of a paid checked bag. Using NDC, the airline could plan to extend the sale of paid checked bags to indirect channels. The airline in this way can estimate from direct sales what the likely take up will be from indirect sales.

The document or presentation that composes the business case may include the following elements: executive summary including your recommendation; opportunity statement; relevant business objectives, analysis of alternatives; recommendation and rationale, risk and mitigation plans; implementation plan.

NDC is not a one-size-fits-all implementation, what an airline plans for NDC and includes in the business case largely depends on **context**. As airlines embark or continue on their NDC journeys, competition is expected to increase, resulting in enhanced customer value and benefits.

If an airline has not started their NDC project yet, three different scenarios for analysis in the business case could be 1) doing nothing, 2) small-scale NDC adoption or 3) large-scale NDC and ONE Order adoption.

When building a business case, it is beneficial to demonstrate each alternative's impact on defined **metrics** to key decision makers (see checklist 2.8). In most organizations, decision makers would want to know financial implications of each alternative, meaning its possible impact on revenues, return on investment, payback period, etc.

There will be both **program-related costs** and **operational costs** after the project

- 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 considered.
- 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.

A **risk analysis** will be needed to identify the likelihood of any potential issues and barriers. In the business case the risk analysis would be fairly general, and then later on it is relevant to dig deeper in to the risk analysis of each stage of the program.

Size and scope of the NDC program

The size and shape of the each NDC program greatly depends on

- What you hope to achieve, i.e. revenue and costs benefits expectations
- What your NDC strategy is, e.g. whether to implement dynamic pricing or not

- What your current status is, especially from an IT point of view
- How you choose to use NDC – as one large program with a wide range of NDC components or as smaller modules, where 'low risk, high value' components come first
- What functions or use cases you plan to implement

Some airlines already have certain IT components, or in some cases capabilities that NDC enables (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. In addition, an airline might want to deploy their NDC implementation only for certain products or for the full portfolio.

Determining the size and scope will amongst other things indicate what kind of program structure is required, i.e. whether a steering committee is relevant, how the program team will look like and what kind of sponsors are attractive. Already in the business case it is important to estimate the manpower needed and to what extent it would be necessary with external assistance.

Product, Payment and Distribution Strategy

The business case should illustrate how NDC will be used to serve the airline's product, payment and distribution strategy. NDC should not determine the strategy, rather it should enable it.

Product Strategy

One aspect is what products to present and how to present them (e.g. an airline may decide to offer bundled fares or paid baggage and then incrementally add further products). Alternatively, the airline may decide to offer ancillaries separately. The airline may even sell non air products such as hotels or cars.

Payment Strategy

In the NDC environment, the 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.

The airline is in a better position than before NDC to manage payment

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

However, implementing NDC might bring the following challenges to comply with strong customer authentication (SCA).

- Implementing a 3DS workflow
- PCI compliance

As the airline is handling payment it must ensure that payment details are secured from being passed through too many entities.

Distribution Strategy

Distribution strategy concerns who and how an airline connects with their travel agency network (see Figure 2.2). This strategy will impact the business case e.g. potential cost savings from direct connect, enhanced distribution capabilities with improved ancillary offerings, etc.

NDC Architecture

Understanding your current distribution architecture and how it will alter in an NDC environment is key to recognizing the impact of the planned changes. This will enable an informative and clear communication to internal departments and senior management. It will also help identify where resources should be allocated.

NDC Reference Architecture

The diagram below gives an overview of NDC related features. This Reference Architecture is guided by a set of architecture principles - i.e. modularization, standardization, integration, and leveraging existing assets - and this architecture can be used as a starting point when defining the NDC architecture of an individual airline.

The NDC Reference Architecture, illustrated in figure 2.1, is organized into layers:

Industry actors interacts with the airline's NDC API (Application Programming Interface) via an NDC aggregator or directly. This NDC API is one of the channels, entry points offered by the Channel layer. The next layer – the Airline Retailing layer – includes the retail capabilities (SHOP – ORDER – PAY) of the airline. Within the retailing layer, the Integration layer ensures the connectivity between the various modules is both scalable and cost effective. The components underneath the integration layer lists existing airline capabilities which NDC is leveraging; for example, this is where the Passenger Service System (**PSS**) is located.

Security and identity management is connected to all levels, allowing secure NDC end-to-end transactions.

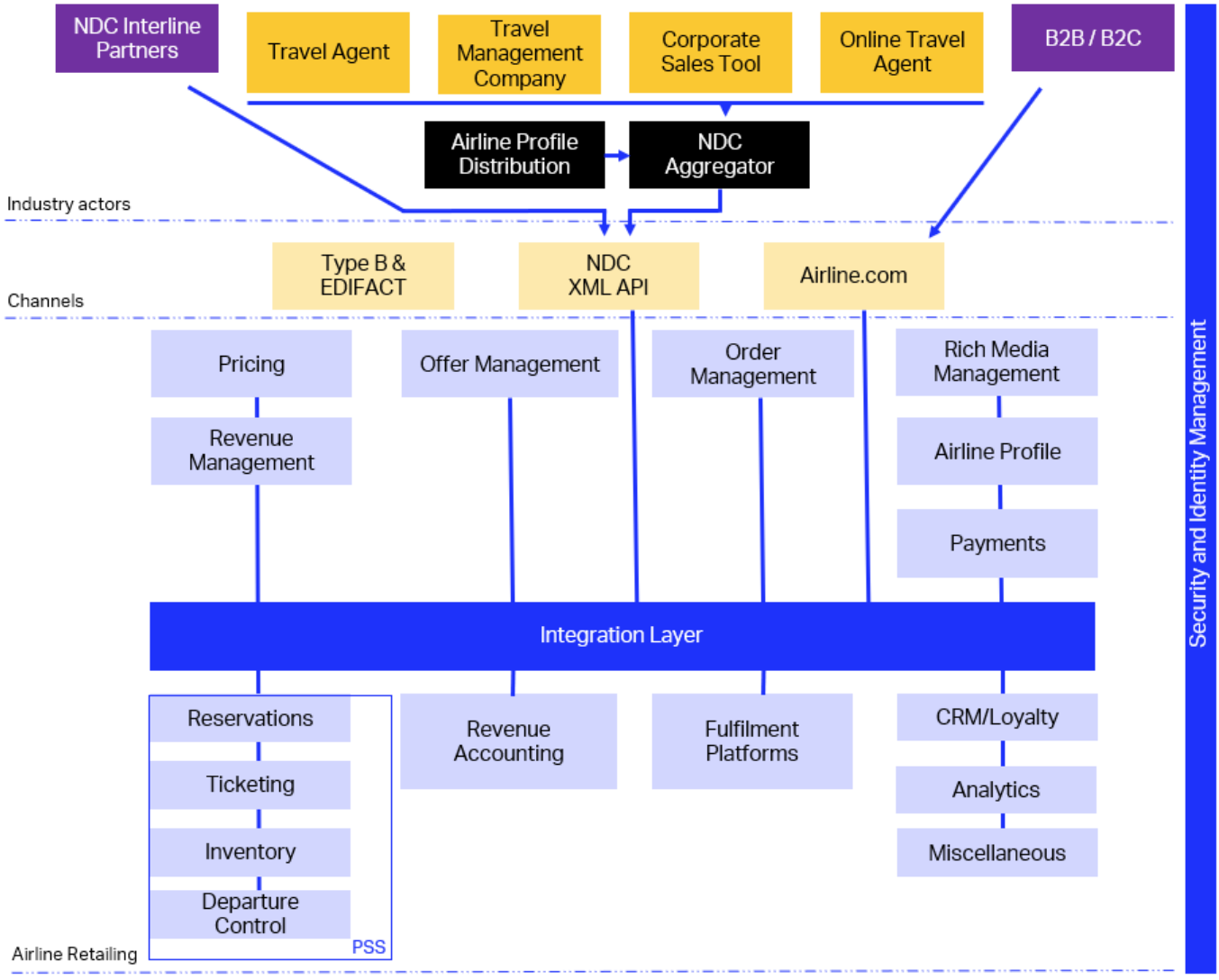


Figure 2.1: NDC Reference Architecture

A TMC reference Architecture

A question worth asking when considering an NDC deployment is: *How will the development impact the airline's 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 on the IATA website if applicable.

Four options to access airline retail Offers

The different flows for travel agents to access airline retail Offers are

- GDS legacy flow: the GDS constructs the Offer from filed airline content
- 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, process payment authorization, create Orders or handles remittance and settlement
- New aggregators: working in a similar way to 'GDS acting as aggregators' described above
- Direct connect: the travel agent connects directly to the airline API (using IT capabilities)

The airline, in compliance with any contractual obligations, will have an opportunity to influence the agent's channel choice by making a particular flow more or less attractive e.g. payment structures and content agreements. The figure below summarizes the different options.

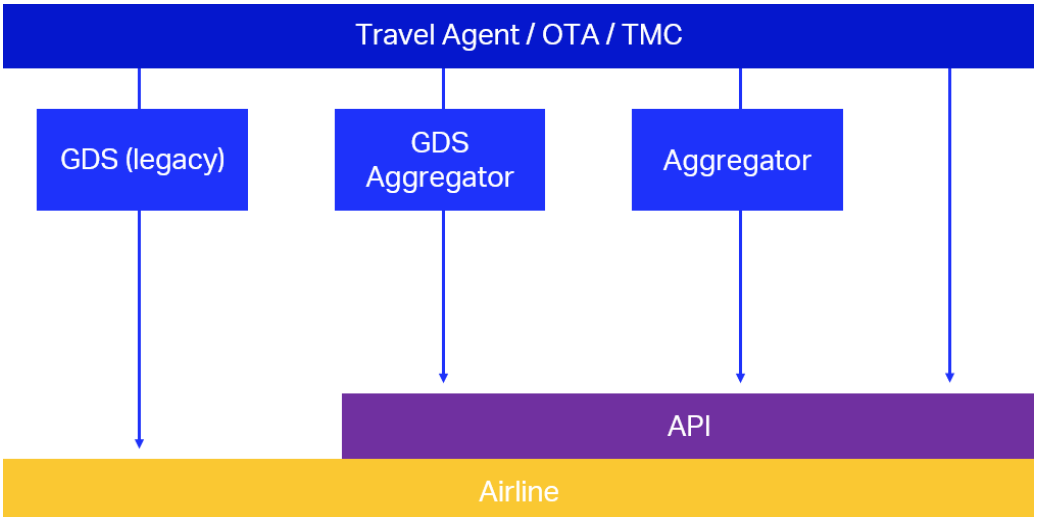


Figure 2.2: Content sourcing

Step 2: Planning

When the business case is approved it is time to action on the framework that has been decided upon and build further on the NDC program plan.

The Program Manager role

Prior to the program implementation a Program Manager will need to be assigned and reporting lines defined. Regardless of the department this role would belong to, the nature of the program indicates

that the Program Manager must be close enough to business departments to share their language and clearly understand the business purpose, 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. A larger NDC program with strong dependencies on pricing, on distribution channels 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 to focus on the several sub-projects.

Whatever the size of the NDC program, all stakeholders involved should be consulted to agree on the project schedule and timelines as well as what resources can be made available and what the reporting structure would look like, including frequency of meetings and reviews.

Program structure and direct stakeholders

NDC is a strategic project, which involves influencing and convincing senior management and therefore, a direct link with the executive board is essential. Furthermore, as with any program of this magnitude, it should have its own **program structure.**

NDC also involves breaking silos and getting departments working together. Consequently, key departments must be identified and actively participate from the beginning of the project.

Checklist 2.5 should help the NDC Program Manager to identify the correct **direct stakeholders** and their possible roles within the program.

It is furthermore crucial to map a **communication strategy** involving every stakeholder group with their specifics (internal as well as external). Prior to the NDC implementation program being initiated, communication is important to build support and momentum as well as alignment. See checklist 2.6 and 2.7 for more information on support and communication.

Set-up review

Determining **key milestones** will help the Program Manager setting up short-term goals that will help the airline assess whether the NDC program is going according to plan. It is also a good excuse to celebrate small wins. In a change process, dividing a program into small chunks might make a larger change process more manageable.

It is also important to **assess and compare the different components** of the NDC program. A good practice is to consider the different priorities along the dimensions of impact versus cost efficiency. This will first of all, enable the airline to prioritise what components should come first to last. In addition, the airline might identify interdependencies among the NDC components, which will have a

lot to say for the order of implementation. Finally, it is important to weigh each component against each other, in case the situation changes (e.g. if fewer resources are available) and some components have to be put on hold or cut off.

In the following, we will look at the key departments typically involved in an NDC program implementation and the topics within each of these departments related to NDC.

Distribution, Marketing and Sales

Distribution, Marketing and Sales is a key area in any NDC Implementation. The distribution representative should make sure the NDC strategy is known as a key enabler to the overall distribution strategy and will play a critical role in coordinating and communicating with the various distribution channels and partners throughout the program (see checklist 2.1 for support on strategy creation).

The program will affect stakeholders outside of the airline, such as travel agencies, travel retail companies and corporate buyers. These external stakeholders are critical to its success. A program strategy to keep external stakeholders informed and aware of NDC changes should be managed by Distribution, Sales and Marketing, which could involve whitepapers, workshops, bulletins, etc.

No matter the size of the NDC program, the sales team will be eager to know the status and should be involved from the beginning of the program. Their jobs may change because of NDC (e.g. discussions with large corporate customers may be focused on long term value, new products and services available in the NDC API, etc.), hence they must be involved to a point where they understand the mindset of change. It is also important that the sales team fully understands the changes being implemented with NDC as a lack of knowledge could undermine the airline's relationship with its resellers.

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

Revenue Management and Pricing

For many NDC features, Revenue Management and Pricing (**RMP**) will be important when determining how the airline will work and shape the business requirements for NDC usage. RMP will also be heavily involved in deciding the ancillary offerings and their prices.

Within RMP, 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.

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 IT platform(s) are key enablers to all features of the NDC standard. The involvement of the IT department in the platform assessment and overall program setup will contribute greatly to its success.

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. More information on scalability can be obtained from the ndc-scalability-report .

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).

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, 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.

Procurement

Procurement needs to be prepared for NDC. Contracts may include clauses that might constrain the airline's ability to implement its new NDC strategy. Therefore, it is important to review any contract that might intervene with NDC development, e.g. PSS contracts, GDS contracts or other. See checklist 2.4 for suggested considerations.

Regarding personal data privacy, NDC schemas must make sure that when a customer's data is shared, it is on a voluntary basis and based on his consent. Customers may be willing to provide more information in order to receive more personalized and relevant offers, but they would want to know that their data is being stored safely. In addition to personal data, this privacy requirement will also apply to payment details.

Distribution based on NDC, or any other means of personalization or shopping with enhanced content, must be compliant with privacy and data protection regulation. A good example is the General Data

Protection Regulation 2016/679 (GDPR), that entered into force 25 May 2018. 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, on the IATA website.

Airline Support and Help Desk

Critical to any NDC implementation is the support an airline offers to those companies and customers that connect to the airline. Areas of support will need to include IT support for the NDC deployment and system performance, in addition to customer service support for functionality issues or guidance.

Depending on how many functionalities the airline decides to integrate in its own operation (e.g. functionalities previously managed by GDSs), it may experience the need for increased resourcing.

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

Response time: Is the system responding within an agreed time frame?
Availability: What are the contingencies if there is a system failure? What is required during scheduled maintenance and system upgrades?
Gaps in functionality: Is every possible scenario covered? (e.g. voluntary and involuntary changes)
System capacity: As more and more travel agents connect and the volume of transactions grows incrementally, is there a risk of system capacity issues?
Error management: NDC is a transformative project and airlines should plan on what support to give different categories of errors.

See checklist 2.2 on Business Process Engineering for considerations on airline support.

Step 3: Program setup

Matching vendor platforms to capabilities

First steps

Selecting an IT vendor platform for NDC should not only take first delivery phase of the program into account but rather the airline's entire NDC roadmap. The platform will either be part of the PSS or developed on top of the PSS. It can be built in-house or purchased with 3rd party IT vendors. At any

point it is good to have some knowledge about vendor offering and roadmap in-house, as these tend to develop over time.

By now, the features and functions required have been identified, RFPs might have been issued or high-level discussions with vendors have been planned to understand the capabilities included in each Offer.

Vendor type

The question many airlines will need to consider is which vendor type they would be comfortable working with – a larger company with the typical safety net and access to a large pool of expertise, or a small, dynamic company with a more agile approach? Are there language or cultural topics which need to be considered in this 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, e.g. in the PSS or e-commerce domains?

The vendor should be seen as a long-term partner in this area, as the NDC environment is constantly developing. It is certain that there will be changes on the airline side, which will require NDC platforms to evolve accordingly.

Product roadmap

The continuous evolvement of the NDC environment indicates that a vendor should have a product roadmap to reflect enhancement of products with additional features and functions. 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?

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.

Benchmarking IT solutions

There are a number of IT companies that have built solutions to process NDC. These solutions enable airlines to bring new products and offers into the market.

The NDC Solutions White Paper provides the results of a study on IT solutions build around the NDC standard and presents aggregated findings. Each IT company remains anonymous. It is recommended to focus on core findings and the methodology. Core findings will bring a valuable understanding of how IT providers have implemented NDC (Offer and Order Management, rich media, interline, etc.) both on the airline IT side and on the aggregation side. The methodology is presented in the Appendix and

consists of an extensive survey that can be used as a possible starting point in the dialogue between an airline and an IT company and during the process of building an RFP.

Read more about individual NDC IT Solutions on the IATA website.

Modularity and Integration

Building a scalable and cost-effective architecture

An NDC architecture should be modular (see 'NDC general architecture' above). A modular system leverages existing assets and at the same time easier 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 interconnected.

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.

When building the architecture, one should not forget scalability. With NDC, the airline systems are now key in distribution flows and manage large volumes of data.

Integration capabilities

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

Relevant questions to be answered are

- What specific integration scenarios are supported?
- Which integration scenarios are required between NDC platforms and sup-porting 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?

These are just a few examples of the questions to be raised, and this area is best reviewed in detail by the airline's IT department.

Pilot test and choosing travel agents

When the program strategy is in place, the next step is to select travel agents that would be ideal partners for the implementation of NDC. This will go in two steps

1. First, select one or several travel agents to pilot NDC. This can also be a metasearch if preferred. Piloting the project with a few travel agents will help to identify any issues or bugs before the general release of the airline's NDC implementation.
2. The second step is to plan towards wider adoption of travel agents, those that the airline wants to include early in the NDC environment.

With time, more and more travel agents will be exposed to the benefits of NDC. However, it is important to expand the program in a controlled manner so that operations will not be negatively affected. The airline should have time to act on the feedback for improvement before including all agents. See checklist 3.1 for key actions.

Step 4: Preparing for Next Steps

The Get Started with NDC Guide has so far provided an introductory framework that covers important considerations during the first, initial steps of an NDC program. In order to ensure a proper understanding of the program as a whole, one final part will put the elements of this guide into the bigger picture.

As mentioned in 'Pre Considerations', the methodology of your NDC program could be agile, but also waterfall style. If waterfall methodology is chosen, the project outlook might coincide with something that resembles to the illustration below.

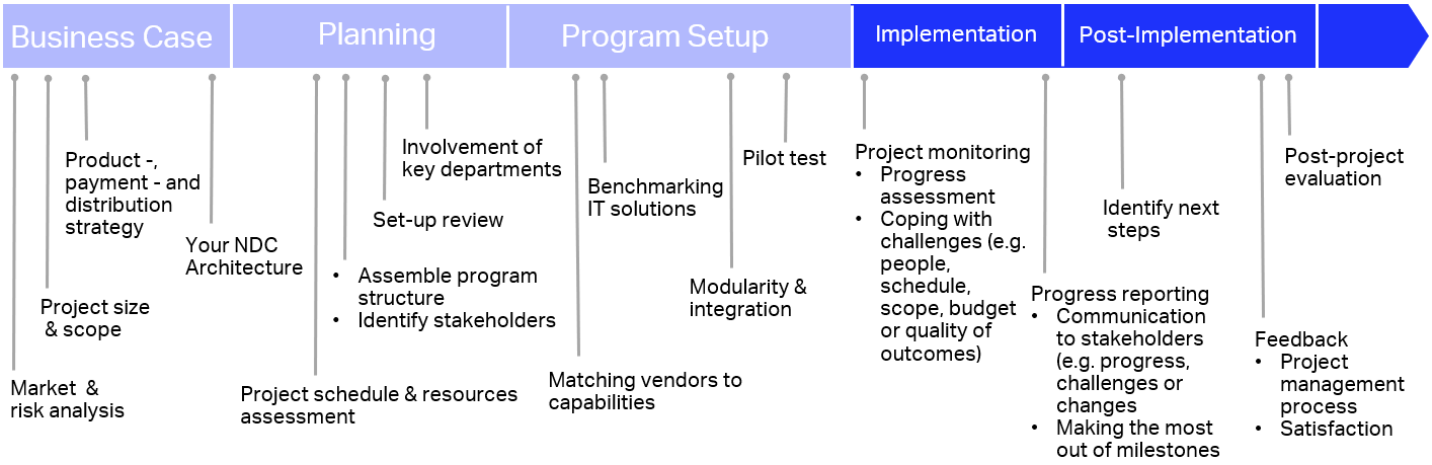


Figure 2.5: An example of a project management model

Figure 2.5 shows the first three phases described in this document. Next comes implementation and post-implementation, which are the phases where the NDC components are coming to life in the airline's external environment.

For more information on the implementation phase, the online implementation guide provides specific information for developers who want to implement the different NDC messages in their IT environment.

Get Started with NDC was last updated: September 2019

Annexes

Annex 1 – Checklists Step 1

1.1. Creating a business case

Size and scope of project	
Map existing airline distribution, processes and architecture	
Assess risks and potential blockers	
Define project metrics and reporting	
Platform assessment and Request for Proposal (RFP) – if applicable	

Estimate program timeline and delivery dates	
Assess program costs	
Set up tentative program structure	
Assess impact to key areas and processes	
Get buy-in	
Estimate support and help resources needed	

Annex 2 – Checklists Step 2

2.0. General strategy and vision

Defining 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?	
Identifying what supporting documentation is needed for the strategical part of NDC	
Defining the high level NDC strategy	
Defining the distribution strategy: direct sales / all channels / creating a new channel	
Do you expect any saving in distribution costs?	
For each sale made through an NDC channel, what is the extra profit coming from the ancillary sales?	
How can the NDC vision become well understood and shared among stakeholders, top managers and sponsors?	

2.1. Marketing and sales strategy (ancillaries)

Defining the 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?	
Are your distribution processes defined and aligned with NDC distribution?	
In which markets do you want to sell?	
Understanding the distribution ecosystem and who your NDC supportive partners are	
Who will consume your content and how?	
Who and how will sales / customers be serviced?	
Ancillaries	
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?	

2.2. Business process engineering

Defining services provided for the sold items in case the customer is requesting it (e.g. voluntary change and cancellation)	
Defining services provided for the sold items in case of disruption (e.g. involuntary change)	
Defining consequences of system disruption:	
What is the agency support in case of direct connect?	
In case of an indirect non-GDS sale?	
Analysing and measuring the potential consequence of internal servicing of the Order	
Completing a high-level processes map to identify the affected organization and processes	
Checking the training that might be necessary	

2.3. Link with IT

Communicating with IT to ensure that the NDC business strategy is shared	
Communicating with IT regarding business needs and requirements	
Work with IT to identify any potential difficulties of NDC integration within the existing architecture, defining specific points of complexity	
Can IT would cope with such a program, e.g. scope of project, volumes of transactions etc? Will external help be needed?	
Checking the understanding of data privacy for IT	
Checking data security and PCI compliance	
Are current systems capable to be updated or already at the limit of their capability?	

2.4. Legal considerations

Check legal impacts concerning data privacy & security	
Check contracts – distribution partners, PSS, IT systems providers, GDS, etc.	
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 if so, how?	
GDS contracts	
Restrictions on distribution by channels	
Content supply obligations	
Restrictions on distribution by markets	
Type of fares	
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.

2.5. Relevant departments for cooperation

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

2.6. Project organisation – external support

Identifying the involved departments and stakeholders in each department	
Clarifying expected involvement of stakeholders and corresponding departments	
Identifying external stakeholders and contact person in each organization	
Creating a relationship map including internal and external stakeholders, and their status (e.g. supportive, neutral or opposing)	

2.7: Communication

Creating the key message (benefit, involvement, expectations) for each stakeholder and their department for internal and external communication	
Defining templates and channels of communication	
Ensuring that the global strategy is shared	
Sharing the global NDC vision (internal / external)	
Ensuring that the distribution strategy is shared and agreed upon	

2.8. Project metrics and reporting

Defining 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?	

Annex 3 – Checklists Step 3

3.1. Pilot testing and choosing travel agents

Defining your key expectations from the pilot (do you test scale, servicing, business model etc.)	
Defining how you will grow the number of travel agents and the distribution mode	
Ensuring processes scale up	
Do you understand the commercial dynamics?	
Ensuring processes scale up	

Annex 4 – IATA resources

Other than documents already linked in Get Started with NDC, IATA has produced various documents to help airlines with their NDC implementation:

WHAT	DESCRIPTION
NDC within IATA	Various content and links to training, NDC videos, guides, case studies, NDCInfocus, standards, governance, etc.
NDC Fact Sheet	A one pager on NDC: The NDC Program, the NDC Standard and more
NDC Educational Videos	• Introduction NDC and provide the 'big picture' • Explanation of airline distribution and operations in an NDC environment • Recommendations on how to get started with NDC
Taking the Reins white paper	The story of how passionate Travel Managers created a vision of the future of business travel aviation in NDC
NDC Pilots and Deployment Reports	Pilot reports are available from 2013 – 2018 as PDFs
AirTechZone	NDC Developers support site

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