

The first edition of IATA's NDC standard was published in 2015. It is designed to modernise indirect distribution capabilities and bring them in line with the product offerings now available via airline websites. Some of the potential benefits of introducing an NDC solution are discussed here, along with the possible procedural and technical changes required.

# IATA's New Distribution Capability standard

**D**istribution is a key function of the airline passenger sales process. Technological developments have led to more dynamic and varied distribution strategies and product offerings, including an increase in ancillary products. These developments, however, have resulted in a growing disparity between the products available to consumers from airline websites and from traditional travel agent channels.

In 2015, the International Air Transport Association (IATA) published the first edition of its New Distribution Capability (NDC) standard, which is a new connectivity protocol designed to permit use of advanced distribution capabilities uniformly across all sales channels.

The NDC standard is explained here. The potential revenue and cost benefits of deploying an NDC certified solution are identified, together with the main technical and procedural requirements that airlines may face when implementing an NDC solution.

## Airline distribution

Distribution is the process whereby airlines market and make seats and ancillary products available for sale via direct and indirect distribution channels.

## Direct channels

Direct distribution channels involve the airline directly marketing and selling seats and ancillary products to the consumer. Until the 1990s, the main direct distribution channels were airline call centres, sales offices and airport sales desks. Developments in technology have since led to these sales channels being superseded by airline websites and mobile apps as the leading methods of direct distribution.

The rapid global expansion of the low-cost carrier (LCC) business model, which began in the 1990s, was, in part, made possible by the parallel development of the internet and the web-based distribution opportunities it provided.

LCCs realised the opportunities and benefits associated with developing e-commerce solutions, including the costs that could be saved from replacing call centres with web-based distribution and sales. LCCs also used their direct website channels to pioneer the concept of airline ancillary products and services.

Under the traditional full-service airline model, the price of a ticket includes a complimentary assigned seat, in-flight meal and hold luggage. The basic LCC model, with its focus on minimising price and costs, unbundles this traditional package so that the ticket cost only covers an unassigned seat. All other services, including seat assignment, hold luggage and on-board catering are sold for an additional fee as ancillary extras. LCCs quickly realised that their direct website distribution channels were the ideal platform for marketing ancillary products and services. As the LCC business model has matured, airlines have introduced increasingly sophisticated product offerings via their websites, including re-bundled fare packages and third-party ancillary services from accommodation providers and car-hire companies. Today, ancillary services are often described as air or non-air products. The former accounts for any services offered directly by the airline, such as on-board meals or hold luggage, while the latter refers to non-airline third-party services such as hotel accommodation.

Full-service airlines have introduced their own enhanced web-based distribution channels and ancillary product offers, partly in response to the increasing success of the LCC model.

## Indirect channels

Indirect distribution involves offering and selling seats and ancillary products to consumers via an intermediary, such as: travel agents; online travel agents (OTAs); travel management companies (TMCs); or other airlines, if there are codeshare or interline agreements in place.

Price and product offers are often distributed to these third parties via content aggregators, including global distribution systems (GDSs).

The use of indirect distribution channels can increase market penetration and brand exposure, especially in foreign markets where airlines' more limited presence and lower sales and marketing budgets, result in lower levels of awareness. Joining GDSs to distribute via third parties can attract more business traffic, since the majority of corporate travellers use travel agents or TMCs, and most of these search and book flights via a GDS (*see Hybrid LCC distribution, revenue management & ancillary revenue generation strategies, Aircraft Commerce, April/May 2016, page 41*).

Indirect channels have always been part of the full-service distribution model, since these carriers want a high volume of business travellers. LCCs have been more hesitant to adopt indirect distribution strategies due to potential costs.

Costs associated with indirect distribution include: GDS segment fees; travel agency commissions; fees for fare and schedule filing; and billing and settlement plan (BSP) charges.

The traditional method of distributing fare and schedule information to GDSs is to file it with organisations such as the Airline Tariff Publishing Company (ATPCO) and OAG which pass the information on to the GDS pricing systems. Airlines are only required to file the data once before it is distributed to all of the required sales channels. The act of

*Developments in the internet and related technologies have seen airline websites and mobile apps supersede airline sales desks and call centres as primary direct sales channels.*

filing fares and schedules does, however, incur fees.

BSPs offer a consolidated source for airlines to exchange revenue with multiple indirect sales outlets including travel agents and other airlines. They offer an agent remittance and airline settlement service. A single BSP will account for all participating agents in a single country, avoiding the need for airlines to establish individual connections with each independent sales outlet. The equivalent system for the US market is the Airlines Reporting Corporation (ARC). Traditional GDS and travel agent processes are based around the use of BSPs and ticketed airlines. It is, however, possible to distribute via GDSs without joining BSPs.

BSP costs include an initial joining fee and Standard Charging Unit (SCUs) fees. SCUs are participation management fees, and are billed for each transaction.

It is only in recent years that large established LCCs have begun using indirect distribution channels, usually when they feel that they have exhausted the growth potential of low fare services in their local markets. For hybrid LCCs, the introduction of indirect distribution channels is one element of a multi-layered commercial strategy designed to increase market share by attracting business travellers and more bookings from outside their home markets.

It is also possible that some LCCs have been encouraged to adopt indirect distribution channels as a result of technological developments. Advances in eXtensible Mark-up Language (XML)-based application programming interface (API) solutions, mean that it is now possible for airlines to connect to GDSs without the need to file fares or join BSPs.

Current XML API technology can also allow more merchandising opportunities to be marketed via indirect channels, either direct to travel agents or via a GDS. Historically, the only data distributed to GDSs was the schedule, fare, availability and terms of travel. This channel was particularly restricted when it came to marketing ancillary products and services. Some GDS providers have since introduced methods to upload additional merchandising content, while API connections now make it possible to distribute all of an airline's ancillary products via GDSs with similar branding to their website offering. The method of displaying ancillary products is described later.



## NDC standard

The technology required for airlines to modernise indirect distribution offers and match the capability of their websites has been available for a number of years.

“LCCs have been distributing to aggregators and agents via XML and APIs for more than 10 years,” explains Moshe Rafiah, chief executive officer at Travelfusion.

During this period airlines have developed their own proprietary XML and API solutions to connect to third-party aggregators or agents.

“The main objective of NDC is to create a uniform standard that will define a common XML structure for future indirect distribution connections,” says Rafiah.

“NDC is, in effect, modernising 40-year-old data exchange standards for airline ticket distribution, which were developed before the internet was invented,” explains Yanik Hoyles, director, NDC program at IATA.

The NDC standard is an XML-based data transmission standard. The traditional indirect distribution approach used by legacy carriers uses the Electronic Data Interchange for Administration, Commerce and Transport (EDIFACT) or teletype messaging.

“The age of e-commerce began for airlines in the 1960s, when US-based carriers first started using computer reservation systems (CRS),” says Jörg Troester, head of corporate strategy, industry and government affairs at Hahn Air. “When it became necessary to connect those systems in the 1970s and 1980s, two messaging standards were developed, Teletype and EDIFACT messaging. Both messaging types have

robustly served the airline industry for more than 40 years and are still in use today. Both, however, are in a flat text format and are not very flexible.”

“The traditional indirect distribution approach involves airlines publishing fares and schedules to GDSs,” explains Stephan Wuerll, senior product manager at Lufthansa Systems. “This process does not use EDIFACT messages. It is when an availability or booking request is processed by a GDS that EDIFACT or Teletype messaging may be used to connect the GDS to the airline's Passenger Service System (PSS).”

“EDIFACT was the main tool used to send and receive data for indirect distribution,” says Jim Davidson, chief executive officer at Farelogix.

“The airline industry is heavily dependent on EDIFACT, a pre-internet electronic data interchange standard,” explains Darko Todorovic, manager passenger business, global travel & transportation for Unisys. “It was designed in the 1980s to transmit data over low bandwidth communication channels and to handle large transaction volumes. Although it has been serving its purpose, EDIFACT requires specialised knowledge. Its rigid structure can increase application maintenance and limits the speed of development in today's environment. XML is designed to store and transmit virtually any type of structured data between two systems.”

“XML is a software and hardware independent tool used for storing and transporting data,” explains Brian Collins vice president of engineering at Mercator. “XML defines a set of rules for encoding documents in a format that can be read by both machines and people.”

“XML is more self-descriptive and



flexible than EDIFACT, which is why developers prefer it,” says Davidson.

“XML has been designed to be an open, international and flexible data exchange format in line with the needs and capabilities of the Internet era,” says Aras Kubilay, business development manager at Hitit Computer Services. “It has been adopted by a wide variety of technology providers across many industries.”

Information sent in XML format is transmitted via Internet Protocol (I.P.) data packets. “This method of delivery allows airlines to display rich content and ancillary services in indirect distribution channels,” explains Richard Burgess, president at APG. “Rich content and ancillary services cannot be displayed using the old EDIFACT technology.”

Airline systems need to be linked to third-party software via an API to exchange information with aggregators or agents in XML format. “An API is a set of key information about an application, such as commands and protocols,” explains Todorovic. “Programmers use APIs to talk to third-party software systems. In NDC terms, an API is the tool that allows an indirect distribution channel access to the airline’s products and services.”

“The use of XML-based APIs has greatly improved data exchange capabilities, although XML’s flexible structure means that each organisation has developed its own proprietary way of sending data,” says Kubilay. “This results in more complex integration and management demands on third-party distribution providers, since they need to develop and manage multiple software interfaces. This will lead to higher costs and longer implementation times for

airlines. The NDC standard will address this issue by introducing certain standards for XML usage.”

“From a distribution perspective it is important that the airline industry is able to speak one language,” says Wuerll. “Under the NDC standard, the syntax (sentence structure) and semantics (context) of XML data are standardised.”

“The NDC standard uses a well-defined set of XML schemas or message sets for different steps throughout the NDC offer and order management process,” explains Wuerll. “IATA has divided the offer and order management processes into different sub-sets, each of which contains sets of XML schemas that define the syntax and an element of the semantics of the XML data that is to be transmitted. The schemas dictate specific mandatory fields that should be included in a certain message set.

“An NDC XML schema defines all data elements that may appear in an XML file,” continues Wuerll. “The schema defines the grammar and structure, while the file contains a phrase in language defined by the schema. Some of the data elements defined by the schema may be mandatory. XML’s design makes it relatively easy to define new versions of an existing XML schema that extend previous versions. This allows new data elements to be added, which will prove useful if new business processes need to be implemented.”

“The NDC Offer Management or shopping schemas allow airlines to distribute their full product offers and merchandise their flights and ancillary services, using rich content, in either an anonymous or personalised manner,” explains Hoyles. “The NDC Order Management schemas allow airlines to

*The use of indirect distribution channels can attract more business travellers, since the majority use travel agents and travel management companies to search and book flights via a GDS.*

manage NDC-driven orders throughout the entire lifecycle, from booking to payment, ticketing and servicing. The booking and servicing schemas allow airlines and third-party agents to manage the order once the customer has selected an offer, and perform servicing at any point throughout the order lifecycle,” continues Hoyles. “The schemas for payment and ticketing allow agents to pass forms of payment details to airlines, resulting in accountable documents being issued to fulfil NDC-driven orders.”

“The NDC XML schemas represent a contract between all parties that XML data is to be sent in an agreed format,” says Wuerll. “It is possible to validate whether data has been sent according to that agreed format.”

An airline will not need to be an IATA member of to implement the NDC standard. While it is not mandatory, there is consensus that potential benefits for airlines will lead many to adopt the NDC standard in the coming years.

## NDC benefits

“NDC will allow the travel industry to transform the way airline products are sold to corporations, leisure and business travellers, by addressing the industry’s current distribution limitations,” claims Hoyles. “For indirect sales channels this will mean improvements to product differentiation and time-to-market, access to full and rich content and finally a transparent shopping experience.

“Airlines will be able to distribute an entire product portfolio, including ancillaries, in a consistent manner across all direct and indirect sales channels,” he adds. “They will be able to do so using rich content, such as photos and videos, with the ability to bring new product offerings to market much more quickly.

“NDC will offer travel agents and aggregators, including GDSs, the ability to work with an airline’s entire product offering, including real-time fare and product information,” adds Hoyles. “This differs from mostly commoditised displays of fares and schedules available in the travel agent channel today.”

In the third edition of its NDC Change Readiness Guide For Airlines, IATA identifies a number of potential revenue and cost benefits that operators could realise as a result of adopting NDC. It highlights benefits at each phase of the sales process, including shopping, ordering and payment.

### Revenue benefits

IATA suggests that additional distribution capabilities provided or supported by NDC will offer new revenue opportunities.

It claims the ability to provide rich content over indirect distribution channels could increase yield or market share as a result of greater product differentiation from competitors. IATA also suggests the potential for airlines to sell more ancillaries, since NDC will allow limitless products and services to be marketed via indirect means, as well as established airline website channels.

IATA highlights how NDC allows airlines to implement dynamic pricing via its indirect sales channels. Dynamic pricing is the ability to make and transmit live updates on the price and availability of seats and any associated ancillary products and offers. It is proposed that dynamic pricing can offer revenue management staff more opportunities and flexibility to optimise revenue than the traditional fare filing approach.

IATA also claims that NDC could bring revenue benefits associated with increased offer personalisation, a simplified interline process and additional indirect distribution channels. As well as presenting offers in more channels, such

as direct connections to preferred travel agents, NDC will offer additional means of payment. IATA suggests that more sales channels and means of payment will make airline offers more 'sellable'.

Another potential benefit of NDC is preventing revenue leakage from lost bookings, by eliminating anomalies in availability between a third-party system and the airline's own inventory.

### Cost benefits

IATA proposes potential cost benefits that airlines could realise from adopting NDC, including a reduction in costs associated with: fare filing, interline process administration, revenue integrity checks and payment processing.

The potential reduction in fare filing costs assumes that airlines will rely more on dynamic pricing and, therefore, file fewer fares using traditional processes.

According to IATA, NDC's potential to simplify the interline process will make interline billing more straightforward by permitting the proportion of revenue due to each carrier to be agreed at the offer or shopping stage. It adds that this should also reduce interline settlement disputes.

Under the NDC structure the airline is responsible for processing and managing offers and orders. IATA suggests this will

reduce the number of required revenue integrity checks. Since airlines will also have control of the payment process, IATA says they will be able to determine which methods of payment they accept and in which circumstances.

### Standardisation benefits

Potential revenue and cost benefits identified so far could all be realised by adopting NDC, but they could also be achieved by using proprietary XML and API solutions developed independently.

"Proprietary XML schemas can fulfil the same capabilities as the NDC standard," admits Hoyles. This may lead some to query why they should follow the NDC guidelines instead of developing bespoke solutions. Crucially, the standardisation offered by adopting NDC should lead to reduced implementation times and costs for airlines.

"Each airline needs to make its own decision about NDC, but IATA supports global standards that bring lower costs, innovation, ease of comparison and interoperability," Hoyles says.

"Industry technology standards are the backbone of travel commerce and allow the broad and rapid deployment of products and services in the most efficient and cost-effective manner," says Dino

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Gelmetti, vice president EMEA, airline solutions at Sabre.

“The NDC standard makes it less costly and more easily repeatable for developers, aggregators, and GDSs to connect to a large number of airlines over time,” explains Davidson at Farelogix.

“NDC facilitates a more efficient airline distribution system, benefiting all stakeholders, including airlines, agents, aggregators, IT providers and interline partners,” says Todorovic. “NDC standards are used by all stakeholders, increasing connectivity between entities and allowing ‘cross-reuse’ of communication APIs. This reduces costs for airlines and software providers and speeds implementation. In the future it is possible that NDC standards will be implemented by other suppliers in the travel and transportation ecosystem.”

IATA also believes that the NDC standard will encourage new entrants to enter the airline distribution segment. This could include software providers looking to take advantage of new indirect distribution processes. “NDC will foster competition in the market,” claims Hoyles. This competition could lead to reduced NDC implementation costs.

## NDC implementation

Implementing an NDC solution will require procedural and technical changes to an airline’s indirect distribution systems. Some of the considerations are addressed here.

### Procedural change

The main procedural impact of an NDC solution is that the airline becomes responsible for managing the indirect

offer and order process. Most airlines already manage offers and orders in the direct channel via websites and internet booking engines (IBEs), but in indirect channels, these processes are still mostly generated via GDSs.

The newly transferred responsibilities will be processed via an NDC platform, which will comprise offer or shopping and order management functions.

“With the introduction of the NDC communications standard, the sales processes are fundamentally changing,” says Troester. “Airlines will no longer transmit flight schedule, availability, tariff and price information to the GDS. Instead, they will directly control the management of their sales for all sales channels, in one place.”

NDC will offer airlines the option to control both their direct and indirect sales channels through their NDC platform.

In its NDC Change Readiness Guide, IATA highlights the procedural changes that will take place at each stage of the indirect distribution process if an airline adopts an NDC solution. These include shopping and booking, payment, ticketing, and revenue accounting.

With the traditional approach to indirect distribution, which is the main method in use today, the GDS creates an offer by obtaining fare, availability, schedule and business rule information from the airline or a third party such as ATPCO. If the offer results in a booking, the GDS will create a passenger name record (PNR), which belongs to the travel agent or TMC that took the booking.

“With an NDC API, the way an airline communicates with the GDSs changes significantly,” says Davidson. “Today the GDSs create an offer for the airline using stored fares, fare rules and

*As airline websites have become more advanced, they have allowed the marketing of an increased number of ancillary products and services, including in-flight catering. This created a disparity with traditional indirect channels, which were limited in their ability to offer ancillary products.*

static schedules and only interact with the airline for real-time availability, giving the airline extremely limited visibility into who is searching for its products. With NDC, the GDSs make real-time calls to the airline via its NDC API to get offers which already include price, any product attributes, schedule and availability.”

The NDC approach will see the airline receiving requests, creating an offer and owning the master order with the latest information. The role of the aggregator or GDS is reduced to transmitting requests and offers between airlines and travel agents or TMCs.

The NDC standard will also involve airlines taking control of the payment process for indirect distribution. Currently, card or cash payment details are recorded by the agent in the customer PNR in the GDS. The GDS then contacts its payment service provider (PSP) for authorisation. Under NDC, the airline receives enough information to process payments using its own PSP. IATA claims the NDC payment process makes it possible for airlines to reduce fraud and payment processing costs, and to apply the same state-of-the-art payment solutions to indirect channels that they apply to their own websites.

The NDC standard will also result in changes to ticketing processes. The traditional indirect distribution method sees the GDS generate a neutral ticket number and send a ticket issuance request to an airline once payment has been accepted. The airline then confirms with the travel agent if it is satisfied that a ticket can be issued. Under NDC, there is no ticketing role for the GDS. The airline and travel agent connect directly, with the airline issuing travel documents once payment is confirmed.

IATA believes that airlines may wish to continue to benefit from BSP membership once they have established an NDC solution, if they choose to run it alongside traditional indirect distribution sales processes. IATA claims that airlines adopting this approach would benefit from a consolidated sales reporting source if they still reported to BSPs.

The use of BSPs means that airlines with NDC solutions will continue to account for indirect sales after the relevant flights have been operated. The main difference with current procedures is that the airline, rather than the GDS, will notify sales to the BSPs so they can

*In recent years, low-cost airlines have begun distributing via indirect channels as one part of a strategy to attract more business travellers and seat sales outside of their home markets.*

collect the revenues due. IATA proposes that airlines could send one daily file of their global sales activities to BSPs via the IATA NDCLink or WebLink service.

Adopting the NDC standard would also influence airline interline procedures. The traditional indirect distribution process sees GDSs construct interline itineraries using filed fare and schedule information from one or more carriers.

In contrast, NDC would allow an airline to obtain content, including ancillary services, from its interline partners just as it is building its offer for the customer. IATA explains that the airline would have to send an NDC shopping request to its chosen interline partner. The partner airline will then send back its offer including seat prices, availability, any ancillary offers, and also any conditions and a settlement value that will be used to determine the final revenue split due to each carrier. According to IATA, the main advantages of the NDC interline process are that it will allow partner airlines to upsell more ancillary services and should give them more control over the revenue they expect to receive.

### Technical change

To introduce an NDC solution, airlines will need to make adjustments to their IT systems, including the implementation of an NDC platform.

“An NDC platform is a suite of software solutions that covers all relevant aspects of NDC processes,” says Wuertl.

“An NDC platform comprises the NDC standard-compliant systems that contain the airline business functions needed to present full information about products to indirect channels, without any preparation by an intermediary,” says Todorovic. “The platform creates, stores and services the master order. Offer and order management are central to these processes. The NDC platform also performs NDC request authentication and security functions and integrates offer and order management with a variety of systems, such as PSS, customer resource relationship (CRM), business intelligence and third-party systems.”

A PSS comprises a comprehensive suite of software solutions that cover a broad range of functions in the distribution and sales process, typically including inventory, reservations and departure control functions. A PSS is therefore a central back-office component



in the traditional indirect sales process.

The level of technical adjustments required to implement NDC could vary. Options include upgrading the PSS to provide NDC platform functionality where applicable, or introducing a new, separate NDC merchandising solution into the airline's IT infrastructure.

“A well-designed PSS can provide full NDC functionality, and that is our aim with our Crane solution,” says Kubilay.

“We are increasingly seeing airlines seeking full control of their NDC offer and order management technology,” says Davidson. “This opens the door to a PSS-agnostic, future-proof situation with lower costs of ownership. It is most likely that hybrid NDC platform models will emerge where certain basic functions, including some order management processes, are housed in the PSS, while more sophisticated offer management elements will be managed by the airline or a third-party technology partner.”

“Airlines should think about what they could achieve with the cheaper, more capable indirect distribution opportunities offered by the NDC standard, and carefully evaluate which of their existing systems would be affected by the transition,” says Kubilay. “The PSS certainly plays an important role since it is usually the ‘nerve centre’ of the entire operation. A well-designed, NDC-capable PSS can avoid the need for the airline to overhaul its other peripheral and back-office systems by acting as an ‘NDC bridge’. In the absence of such a PSS, the airline might use integration layers as a stop-gap measure.”

“An airline's NDC implementation will rely on the existing assets it can leverage,” says Todorovic. “Some airlines may be able to reuse the merchandising

solutions used for their direct channel distribution. Others may already be using proprietary direct connect APIs with travel distributors which can be an asset during NDC implementation. We think that airlines will discover most PSS-related limitations when it comes to processing orders rather than PNRs. Airlines basically have two options: they can enhance the capabilities of their PSS, or they can implement an order management solution on top of the PSS.

“In some cases a PSS upgrade may not be viable, or too costly,” adds Todorovic. “Any separate order management solutions will need to be flexible to meet immediate requirements, but also to adjust, optimise and adapt to the changing distribution landscape.”

“Rich content creation, and the bundling and merchandising of ancillary products and services require specialised supporting systems and upgraded revenue management capabilities,” continues Todorovic. “NDC platform deployment architecture has to be carefully designed to support workloads caused by the potential high volume of offer or shopping requests.”

“The PSS will continue to handle legacy GDS communications and processes,” adds Todorovic. “More sophisticated NDC implementations will, however, be able to consolidate all PSS bookings as orders in the NDC order management function and create consistent multi-channel master control and servicing capability.”

A crucial element of implementing the NDC standard is APIs linking the airline to aggregators or travel agents. Since the NDC API will be the main interface for any third parties controlling offer and order management, it will need to



connect to the airline's back-end systems.

"Airlines need to develop a new API middleware layer to offer NDC," says Rafiah. "This can be provided by the PSS provider or developed in-house or by a third-party system integrator. In the back-end, the NDC API will need to connect to the PSS, revenue management, payment, ancillary and merchandising functions."

### Other considerations

"One of the advantages of NDC is that airlines can implement as much or as little of it as they wish into their existing distribution strategies," says Troester.

Airlines may choose between partial or full NDC implementation. Some may adopt a phased approach, starting with offer management capability before introducing order management.

"The full scope of changes required to implement an NDC solution will depend on what is agreed in response to a number of key questions," says Wuerll. "Does the airline want to implement a full or partial NDC solution? What capabilities will the merchandising solution offer? How will existing legacy systems such as the PSS be integrated during the transition phase and continue to provide parallel processing for the legacy PNR-based indirect distribution approach? How will existing or new sales channels be connected to the NDC offer or order management system? How will alliance partners be affected by any changes? Are existing RM and pricing processes still suitable, or is a new dynamic pricing solution required? Is the airline mainly interested in selling ancillaries, merchandising its products, or offering innovative services in air travel?"

"Lufthansa Systems strongly

recommends a phased approach that fits an airline's markets and processes," adds Wuerll. "NDC will require a continuous transition process."

It is likely that most full-service airlines will continue to file fares using traditional processes in the medium term, even as they establish NDC capabilities.

"The traditional fare-filing approach to indirect distribution has been around for 40 years and is tried and tested, so airlines will not switch overnight," says Ian Heywood, global head of product and marketing, air commerce at Travelport. "In the medium to long term, EDIFACT messaging will still be used, so airlines will need to consider the potential technical and administrative complexities of using EDIFACT and NDC solutions in parallel."

"The use of two different standards to support indirect sales channels will increase complexity in the short term, but in the longer term, processes will be streamlined and complexity reduced," claims Wuerll.

The time and cost of implementing an NDC solution will vary by carrier, and the airline business model could affect this. "Full-service carriers have a lot of interdependent business processes and commercial models built around existing frameworks," says Kubilay. "While they stand to gain greatly from the potential cost savings, NDC implementation is likely to be more cumbersome for them. We have seen similar pains with legacy carriers when it came to ancillaries and unbundling. LCCs will be able to start harnessing the distribution opportunities presented by NDC much more easily."

"Full-service or hybrid carriers could have more work to do to upgrade their systems for the NDC standard," says

*Adopting the NDC standard will result in changes to ticketing processes. Under NDC, the airline and travel agent connect directly, with the airline issuing travel documents once payment is confirmed.*

Collins. "This is because they are more likely to have complex reservation and fulfilment processes in place with multiple connections to existing third-party channels, whereas an LCC with no third-party indirect distribution channels could present a new NDC API to third parties with a minimum amount of work."

### Airline uptake

"As of the end of April 2017, 33 airlines have deployed the NDC Standard and a further 86 have said they plan to deploy it in the future," says Hoyles.

It is possible that the benefits of the NDC standard will encourage some airlines to change their distribution strategies. "Airlines that do not currently distribute through travel agencies may change their minds as a result of NDC," says Todorovic. "This will depend on why the airline is not distributing through indirect channels already."

### NDC Certification

IATA has established three levels of certification which confirm the scope of particular stakeholders with respect to sending and receiving NDC messages. These stakeholders include airlines, agents, aggregators and third-party software providers. The NDC certification programme validates that the structure of the applicant's NDC messages accurately follows the relevant version of the applicable NDC schemas.

"The certification process tests specific NDC solutions to examine the capabilities of airlines, agents and aggregators to receive and send NDC messages," says Hoyles. "Any airline that deploys an NDC API to make its content available, or any agent or aggregator that uses these APIs to access that content, may apply for NDC certification. Any vendor that offers NDC products and services for airlines and travel agents can apply to be NDC-capable."

"NDC-certified and NDC-capable statuses have three levels of attainment," continues Hoyles. "Level 1 covers implementation using past and current NDC schemas with a limited scope, for example, sale of ancillaries post-booking. Level 2 focuses on offer management, and requires a more extensive use of the shopping/offer management API. Level 3 targets end-to-end NDC deployments. These cover both offer and order management and where the airline takes

Farelogix offers an NDC platform covering offer and order management functions. The farelogix merchandising engine allows airlines to offer personalised seat pricing.

full control of shopping as well as booking, payment and ticketing.”

## NDC-capable providers

When considering an NDC implementation, it is important that airlines know the capability levels of distribution partners, such as aggregators or other third-party technology providers, including PSS solutions. If these distribution and technology partners are not NDC-capable it could affect an airline's implementation strategy.

A basic introduction to current NDC capabilities of some potential distribution and technology partners is provided here, but airlines should, make independent enquiries to fully establish the levels of NDC certification or capability that proposed partners have achieved.

Some organisations offering services in the indirect distribution segment have adjusted products or introduced new ones to accommodate the NDC standard. GDS and PSS providers have begun adapting solutions to offer various levels of NDC capability, while some other third-parties have taken the opportunity to develop new NDC-related services.

## GDS providers

There are three main GDS solution providers: Amadeus, Sabre and Travelport. Amadeus and Sabre provide GDS and PSS solutions, while Travelport is focused on its GDS activities. All three GDS providers have adjusted their systems to accommodate various levels of NDC capability.

IATA claims that the three main GDSs are NDC-capable at different levels and are progressing on their certification processes. IATA says it is encouraging the GDSs to adopt the full spectrum of NDC functions as quickly as possible.

“Amadeus's GDS already has many proprietary XML connections in place, the first of which was introduced in 2007,” says Rob Sinclair-Barnes, strategic marketing director, airlines at Amadeus. “Amadeus was the first to implement the original version of NDC XML v1 in production with United Airlines in 2014.” This was before the NDC standard was introduced.

“Amadeus has developed Amadeus Anytime Merchandising, a platform that powers the advanced capabilities needed with the NDC initiative,” adds Sinclair-Barnes. “This platform allows airlines to

The screenshot displays a flight booking interface for a Boeing 777-300ER (777) in Economy Class. The top section shows a legend for seat status: Available (blue), Occupied (grey), Selected (orange), Restricted (light blue), Preferred (green), and Premium (dark green). Below this is a seat map with rows J, H, G, F, E, D, C, B, and A. A tooltip for seat 311H is visible, listing options: 'Aisle seat on Exit row', 'Exit row', 'Leg space seat', 'Premium Seat Option', and 'Up to 8 in more legroom'. Below the seat map is a table of traveler information:

Traveler	Seat	Status	Info
MR JEREMY GIGOWSKI	211R		Aisle seat on Exit row
TIM REIZ	305		Aisle seat
MR MICHAEL ZUMDECK	313		Aisle seat on Exit row

At the bottom of the interface are 'Submit' and 'Cancel' buttons.

Images depicted are for illustrative purposes only.

execute merchandising strategy to drive new revenues and to provide personalised offers at each stage. In 2016 Avianca became the first airline to pilot the Amadeus Anytime Merchandising Platform, which is NDC-compliant.”

Amadeus acquired PSS provider Navitaire in 2016. “Navitaire's New Skies PSS also includes an NDC solution, called Navitaire NDC Gateway,” says Sinclair-Barnes. “In 2016 Navitaire user GOL completed a successful NDC-XML pilot by adapting existing booking processes in the New Skies system to the NDC-XML standard. Amadeus supports and is committed to NDC XML,” continues Sinclair-Barnes. “In June 2016, Amadeus and Navitaire were among the first to be granted Level 3 NDC certification as IT providers.”

“Sabre continues to be actively engaged with IATA's NDC programme, as demonstrated by its 'industry-first' implementation in 2016 of an NDC-based technology solution to sell American Airlines' premium and paid seats in a GDS,” says Gelmetti. “Sabre is Level 1 certified as an aggregator. Using XML we have already implemented paid seats in the Sabre GDS for three airlines.”

Sabre offers an NDC-capable PSS called SabreSonic, and has also developed a modern technology platform around its core GDS, called Sabre Red Workspace. Sabre describes Sabre Red as an NDC-capable market place where travel agents can shop, book and manage travel. “Sabre Red offers a content-rich platform with decision support tools, predictive data insights and merchandising capabilities that bring agents and suppliers together to create personalised experiences for travellers,” says Gelmetti.

In February 2017 Travelport became

the first GDS to achieve Level 1 NDC certification as an aggregator, and Level 2 status as an IT provider. It claims that this makes it the first GDS to be designated as an NDC-certified aggregator and NDC-capable IT provider.

Ian Heywood at Travelport claims that airlines that have developed XML API solutions for indirect distribution, including those with NDC-compliant solutions, are seldom using them to send ancillary data or rich content because current legacy connection speeds are too slow to make this efficient. Heywood highlights a merchandising solution that Travelport developed in-house called Rich Content and Branding. While it is not NDC-compliant, it allows airlines to market their full product offering to travel agents connected to Travelport. Airlines can upload their content to Travelport via a web portal.

## PSS providers

There are a number of PSS solutions on the market. Some PSS providers have developed NDC-capable solutions. IATA claims that several PSS providers are level 3 NDC-capable with solutions that offer order management capabilities.

Hitit Computer Services is an IT solution provider that developed the Crane PAX PSS. “Hitit's approach to airline IT solutions has always been about providing a modern end-to-end platform that is open, flexible and therefore capable of keeping up with the changing needs of an increasingly dynamic industry,” says Kubilay.

“Our core PSS offering Crane PAX and our combined web-and-mobile platform Crane IBE, make the best use of Internet and online technologies,”

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continues Kubilay. “We view IATA’s NDC standard as a validation of our existing approach. Adapting the NDC standard has been a natural step for Hitit, especially since we were involved in IATA’s NDC development workgroup. Hitit is a Level 3 NDC-capable IT provider. Our NDC capability provides offer and order management through the Crane PSS, without the need for any additional NDC platforms.”

Other PSS providers have developed NDC platforms designed to integrate with legacy PSS solutions. Unisys provides a suite of PSS functions under the AirCore brand, but is developing a separate NDC platform designed to sit on top of existing PSS architecture.

“Unisys is partnering with JR Technologies to provide a complete NDC platform,” says Todorovic. JR Technologies’ offer management solution will be integrated with AirCore’s order system, a new solution based on existing modules of the AirCore PSS.

For AirCore users, the NDC platform extends the functionality of the PSS in a modular way. For non-AirCore PSS users, the NDC platform will be separate and sit on top of the PSS.

“Apart from processing standard NDC messages, AirCore order management connects with an airline’s PSS in a format the PSS can already communicate in,” says Todorovic. “This permits cost-efficient, bi-directional and real-time synchronisation of orders and PNRs. AirCore order management is designed to address full customer-centric order servicing on top of any airline’s PSS, which greatly reduces the amount of PSS development required.” Unisys will begin the NDC certification process with IATA in June 2017.

### Other NDC IT providers

Other non-GDS or PSS solution providers have developed NDC-related capabilities, including NDC platform functionality. “APG offers general sales agent services, BSP and ARC joining and support services and an interline e-ticketing hub, called APG IET,” explains Burgess. “We also offer fare-filing services and a partnership product with UATP for smaller carriers. Recently we have been developing our APG NDC distribution platform, which is IATA Level 3 certified.

“The APG NDC platform can be used in different ways. Airlines with their own websites can connect to the platform to sell air ancillaries,” continues Burgess. “Alternatively, they may use the platform to sell products and dynamic offers, with order fulfilment performed by APG.

“Airlines do not need to make major changes to their IT systems because we can add new functionality by integrating the APG NDC platform with their current legacy PSS solution.”

Over the past decade Farelogix has focused on providing direct connect API technology for airlines. More recently it has turned its attention to offer management engines for airline-controlled pricing and merchandising, as well as continued work on NDC.

“Farelogix has been a leader in delivering direct connect airline connectivity and API distribution, initially for GDS bypass scenarios,” explains Davidson. “With the advent of NDC, Farelogix has expanded product delivery on technology and services for airlines to create, control and deliver offers to any sales channel. Recently this has included

Travelport’s Smartpoint is a travel agency point of sale solution. It can display airline branding, including fare groups.

NDC API connectivity to the GDSs on behalf of a few airline customers. Due to the growth and interest in NDC, Farelogix has expanded its product set to an NDC platform with offer and order management functions, including: FLX Merchandise (airline merchandising); FLX Shop & Price (high-performance shopping and pricing); FLX Availability Calculator (airline managed real-time availability calculation); and FLX Schedule Builder (dynamic schedule building). FLX Open Connect (direct connect) is as an evolving order management platform with a roadmap for IATA’s One Order initiative.”

“Farelogix supports the NDC API schemas,” says Davidson. “Farelogix has its own proprietary schema which was contributed to IATA and served as the initial NDC baseline. We maintain IATA Level 3 NDC certification.” The FLX platform feeds all channels using an NDC API which is level 3 certified.

Lufthansa Systems has been working with partners, including JR Technologies, to provide solutions along the whole NDC process chain. “We propose a parallel approach to distribution by supporting the operation of an NDC channel alongside the traditional EDIFACT channel,” says Peter Schoeber, director of revenue management and pricing at Lufthansa Systems.

“The platform comprises a full merchandising solution including offer and order management, next generation RM, dynamic pricing, channel management and revenue accounting solutions,” adds Schoeber. “Major components of the platform are already available and certified to Level 3.”

Travelfusion is an aggregator that has developed its services to meet the NDC standard. “Travelfusion is uniquely positioned to provide airlines with a large distribution network which powers hundreds of agencies in all channels” says Rafiah. “A single integration between Travelfusion and an airline will automatically open direct access to hundreds of agents and meta-search services. Travelfusion also offers an NDC API solution, where Travelfusion manages the API middleware on behalf of the airline. This avoids the need for an airline to invest in an expensive API middleware. Travelfusion is Level 3 NDC certified.” - NMP [AC](#)

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