

NDC Adoption Unveiled

The Current State of Servicing NDC Transactions



Part 2



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Welcome to Part 2 of our series on the practicalities of implementing NDC, the New Distribution Capability. Part 1 provided an overview of NDC, the resulting emergence of hybrid EDIFACT and NDC distribution models, and indicative solution architectures for servicing bookings in the new models. Part 2 focuses on how NDC records differ from the traditional EDIFACT-based PNR, and the operational capabilities required to service NDC bookings through various channels.

With airlines launching recent initiatives to drive NDC adoption, there is a flurry of activities being taken by travel distributors to understand the impact and address their clients' needs. Most are realizing that current processes, systems and travel advisors are not prepared to handle the changes driven by NDC transactions and are looking for solutions to continue to provide a full range of content, and maintain satisfactory service levels for clients.

We expect NDC programs and adoption to continue to grow, meaning NDC orders will have to be serviced, and at increasing scale. This in turn will require investment in technology, people and processes to ensure a seamless client experience. Compounding this is the uncertainty about what can be serviced, how it will be serviced, and with what degree of automation.

Our goal is to provide practical, actionable information about integrating NDC transactions into leisure and corporate travel agency operations. While our focus is mainly on Online Travel Agencies (OTAs) and Travel Management Companies (TMCs), we hope all the players affected by NDC will benefit from this information.

Every operating environment is different, so the specifics will vary from operation to operation. Our observations represent a snapshot at this point in time and are meant to provide a useful foundation for planning and execution. We cannot guarantee the absolute accuracy of the information or how it will evolve. Please think of our NDC series as a springboard to your planning, which should include directly validating the information as it applies to your specific context.

Special thanks to the teams at Cornerstone and DataArt who live and breathe NDC every day, among many other responsibilities, and who contributed to this work.

We hope you enjoyed Part 1 and find this installment a valuable addition. Please contact us to schedule a discussion on planning your successful NDC roadmap.

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The Objective of this Paper

We believe that many of the disconnects, confusion and frustration surrounding NDC stem from the different frames of reference between airlines and travel distributors.

Many of the airlines we have spoken with are focused on personalization and merchandising. They value speed and the ability to test, learn and adapt. Their focus is also primarily on offers within their own airline, not across the entire market.

Distributors, especially Travel Management Companies (TMCs), are focused on providing choice across the entire marketplace and on service delivery that can span multiple airlines, rail, hotel, and ground transportation providers in a single trip. They are often responsible for managing corporate travel policy fairly and consistently. Legacy distribution and mid-office systems lack the structure and flexibility to support NDC transactions. Online Travel Agencies (OTAs) and Online Booking Tools (OBTs) don't face all the same complexities. Some have implemented NDC at scale, but still face many of the servicing challenges.

Our goal is to help bridge the gap by focusing on values and objectives that everyone has in common: a great customer experience delivered in the most efficient, cost-effective way possible.

Post-order servicing of NDC transactions is a major pain-point across the whole ecosystem, starting with the customer. And as they say, "If the customer ain't happy, ain't nobody happy."

We do this by outlining the differences between NDC and traditional EDIFACT-based bookings, then show how they impact servicing those transactions by OTAs, TMCs and other distributors. We hope this will accelerate the healthy discussion and joint problem solving that is already underway.

We cover the major categories of servicing and identify the major differences between traditional EDIFACT-based records (Passenger Name Records or PNRs) across the different Global Distribution Systems (GDSs), aggregators and direct airline connections, and the desktop aggregation tools used by agents to make and service air bookings.

Key topics include:

- **Differences in the information contained in the booking record**
- **A framework for examining different servicing categories**
- **A review of serviceability for each of the categories**

The Current State of NDC Serviceability

This section outlines at a high level the differences in servicing NDC-booked orders compared to traditional EDIFACT-based records. For simplicity, there are four groups:

- **EDIFACT-based:** This is the traditional GDS Passenger Name Record (PNR). We use this as the basis for comparison because it has been so widely used for such a long time.
- **NDC GDS:** These are NDC bookings made within one of the GDSs, so they are “GDS bookings” too.
- **NDC Aggregator/Direct Connect:** Agencies may access airline content and make booking through portals, API connection or other forms of direct connect, either through the airlines directly or via aggregators that manage the NDC APIs or portals for the airlines. While these can be brought into the GDS environment by creating a passive segment, they are not considered “GDS bookings”.
- **Desktop Aggregation Tools:** Many agent-facing and online self-service booking tools are building out their NDC capabilities. Like the GDSs, they bring the NDC records into a broader, integrated platform.

Unfortunately there is no magic NDC switch that turns the capabilities on for all airlines so that they all have the same capabilities. Each carrier must be certified for each action within each platform before getting access. Examples of specific certification are:

- PNR Retrieve
- Order Retrieve
- Order Change
- Queue RQ
- Get List
- OrderChangeRQ
- OrderRetrieveRQ
- Time change
- Flight change
- Cancelled flight

We recommend that agencies and other distributors validate this section within their current automation in detail. Some specific examples:

- Most custom business rules will function on NDC passives as they do with other passives. Business rules that perform GDS Make Entry not related to the Air itinerary should continue to work. Examples: adding remarks, Fare Savings, UDIDs. Business rules that perform an entry related to air are typically not valid on an NDC order (example: WP/pricing, *IA). The entry will return an error but will not result in Reject/processing issues.
- Review any automation that has pricing entries. While these entries will not impact processing, omitting them on NDC records will reduce hits to the GDS.
- Test NDC PNRs and review logs/commands that may be unique to agency processing.
- Commands such as ‘Source’ = NDC_GDS can be used to skip commands that are not relevant or valid on these NDC PNRs.

1.1 Comparison of Data: EDIFACT-based Distribution vs. NDC

Many of the issues in servicing NDC-based transactions stem from differences in the data that is contained within the record. These can vary depending on the source of the transaction and the technology used to service it.

CATEGORY	EDIFACT-BASED	NDC GDS	NDC AGGREGATOR/ DIRECT CONNECT	DESKTOP AGGREGATION TOOLS
General	Many profiles are stored outside the GDS and applied at the time of booking	Travelport and Sabre allow both EDIFACT-based and NDC segments within the same record (PNR).	Select each carrier individually. Schemas may vary by airline. May require certification for each airline individually. NDC records (Orders) are generally transferred via JSON, though this can vary.	Most have built profiles and orders that combine GDS, consolidator, aggregator and direct connect into a consistent file, so will have comparable capabilities to the GDS.
Traveler Profile Information	Integrates all data from the profile, including contact, traveler identity, corporate account number, traveler type, preferences, loyalty numbers.	Same as EDIFACT-based	Most aggregators lack traveler profile information. Their records typically contain name, contact info, some limited remarks and may also contain reporting or other user-defined fields.	May have GDS profile integration, traveler identity, corporate account number, traveler type, preferences, loyalty numbers, similar to the GDS.
Flight Information	All are standard flight segments, either GDS-booked or passive.	Travelport’s Apollo platform and Sabre allow NDC and EDIFACT-based air segments in the same record. Otherwise, they are separate PNRs. Most will offer all as an NDC order within a single carrier to avoid splitting NDC and EDIFACT-based records. There may be two records behind the scenes.	Aggregators and Direct Connects generally process individual bookings within a single carrier and pass them through to the agency individually. The downstream systems used by each agency are responsible for combining records from multiple sources.	Flight information will generally be limited by the data contained in the record for each booking source. Some systems can combine GDS and non-GDS sourced records and NDC vs. EDIFACT-based formats into a single trip record that combines both.
Ancillaries and Fare Bundles	Ancillaries that are booked and ticketed through the GDS will be captured in the record.	Ancillaries are booked as part of the NDC order, which is outside the GDS. Only Amadeus includes ancillary services in the record. Sabre and Travelport do not as of the time of publication.	Ancillaries and fare bundles are booked as part of the NDC order and are part of the file.	Ancillaries and fare bundles are booked as part of the NDC order and are part of the file.

EDIFACT-based Distribution vs. NDC (continued)

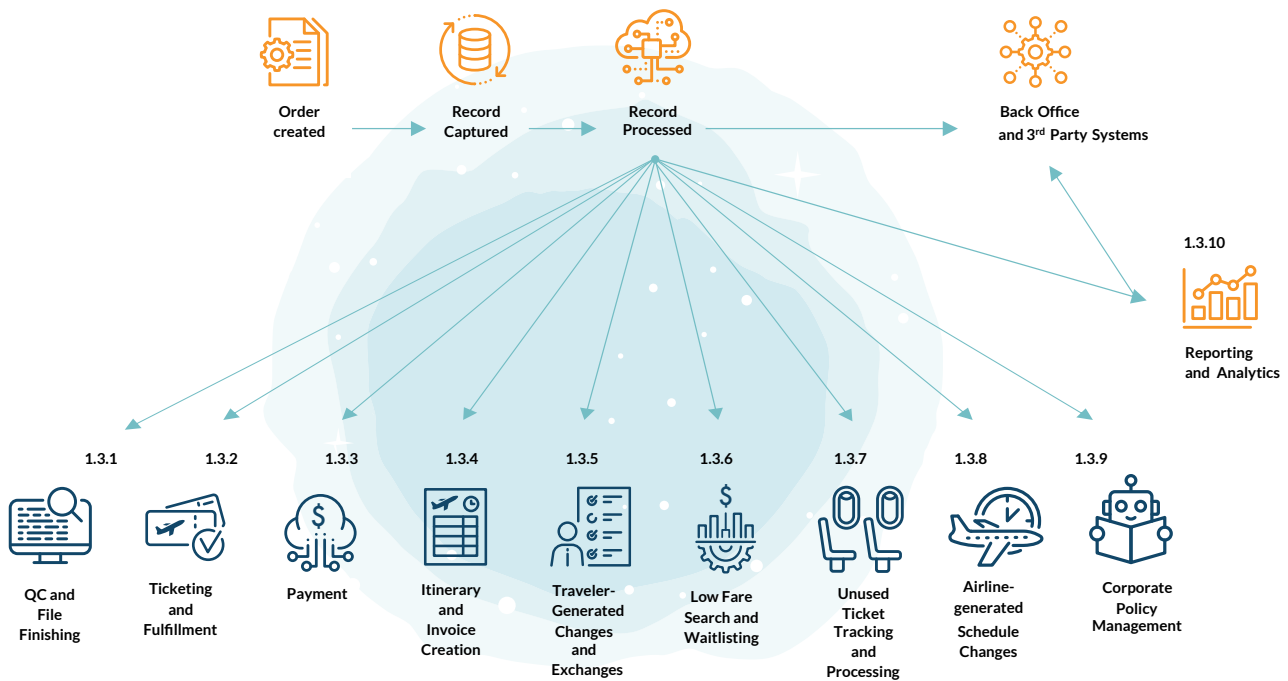
CATEGORY	EDIFACT-BASED	NDC GDS	NDC AGGREGATOR/ DIRECT CONNECT	DESKTOP AGGREGATION TOOLS
Fare Information	Fare basis codes are used to capture the fare type. Comparison fares for lowest available and exception codes may also be captured.	Travelport can store the fare information for both NDC and EDIFACT-based records, and issue tickets on the combined itinerary.	NDC is moving away from more static fare basis codes to include fare bundles, continuous pricing and personalized offers. Some providers may include reporting fields for low fare comparison	Treatment may vary by provider, ranging from GDS-like fare codes to NDC's pricing structures.
Corporate Travel Policy	Integrates all data from the profile, including contact, traveler identity, corporate account number, traveler type, preferences, loyalty numbers.	Policies and total fares will be in separate PNRs. Policy can be accessed and applied to NDC transactions.	Corporate Policy is not stored or accessible, so can only be applied manually after the sale	Corporate Travel Policy is generally stored or accessible. May have similar capabilities as the GDS.
Accounting Information	Accounting and reporting information can be included in the PNR using User-defined fields	Accounting fields are not contained in the NDC record but would be in the traveler profile. Some mid-office systems can pull this information in as part of file finishing.	Accounting fields are not contained in the NDC record, and the aggregators do not have access to traveler profiles that may contain this information. Some mid-office systems can pull this information in as part of file finishing.	Accounting fields are not contained in the NDC record but would be in the traveler profile. Some mid-office systems can pull this information in as part of file finishing.

1.2 NDC Serviceability Framework

NDC bookings made through the GDS and through direct connects or aggregators can be processed and automated to varying degrees. The differences are based on the source and the post-order processes for each agency.

Bookings made outside the GDS are generally integrated through passive segments. Amadeus and Sabre do not charge passive segment fees if the NDC order is made within their systems. Fees or penalties may be applied if booked elsewhere. This can vary widely by carrier, BSP/ARC region and other factors.

The following diagram outlines a typical flow of post-order transaction processing. This section outlines the basic capabilities and constraints for each function.



1.2.1 QC, File Finishing

NDC records that are booked via the GDS will appear the same way as a non-NDC PNR except they will be passive segments. Some fields may not be present to capture. The specific functionality varies by GDS since each GDS is in a different stage of development. QC functions will work to the extent that the data is contained in the record. Elements that are in the profile can be applied and QC performed. Profile information is generally not available in direct connect or aggregator records, so QC in these areas cannot be performed.

File finishing that enriches the record with additional data like reporting lines and queuing to third parties like Travel Risk Management providers can be performed within the GDS PNR but not with aggregators or direct connect. Both QC and file finishing can be performed with other front-end booking sources that have similar transaction records to the GDS.

Aggregator and direct connect NDC transactions are generally submitted as a JSON or XML file. They can be captured and processed, but business rules cannot interact with the aggregator or direct connect booking for file finishing.

NDC records created outside the GDS will generally have trip data in the file that can be handed off to back office systems or third parties. The data is limited by the information that is contained in the file, which can vary depending on carrier and/or aggregators. Traveler preferences, reporting fields and other details that are contained in the profile may be missing in aggregator or direct connect records.

Most custom business rules will function on NDC passives, same as they do with other passives. Business rules that perform GDS Make Entry not related to the air itinerary should continue to work. Examples: adding remarks, Fare Savings, UDIDs.

Business rules that perform pricing entries related to air typically will not work on an NDC order (example: WP/pricing, *1A). The entry will return an error but will not result in Reject/processing issues.

- **Amadeus** does not currently allow for combined NDC and non-NDC air segments in the same PNR.
- **Sabre** allows for combined segments of NDC and non-NDC air segments in the same PNR.
- **Travelport** is able to combine NDC and non-NDC segments into a single record if booked on Travelport+. Fees or penalties may be applied if booked elsewhere. This can vary widely by carrier, BSP/ARC region and other factors.
- **Aggregator** bookings are generally put into the GDS as passives. Some systems have functionality that passes the record directly to the back-office systems and other third parties without needing to create a passive segment.

Most custom business rules will function on NDC passives, same as they do with other passives



1.2.2 Ticketing and Fulfillment

For EDIFACT GDS bookings, Ancillary Services that are booked and ticketed through the GDS will be captured in the record.

For NDC GDS bookings, Ancillaries are booked as part of the NDC order.

Ancillary services currently only appear in the Amadeus record. They do not appear in the Sabre and Travelport records today.

With NDC Aggregators and Direct Connects, ancillaries and fare bundles are booked as part of the NDC order and are included in the file.

For Desktop Aggregation Tools, Ancillaries and fare bundles are booked as part of the NDC order and are included in the file.

The quote for the order typically bundles the fare and Ancillary Services but separate documents are issued when the Order is fulfilled.

Amadeus

- NDC booking records have Fare Quotes and Ancillaries (TQM) when part of the order.
- Order fulfillment is in production for E-Tickets and Ancillary Services (EMDs).
- NDC bookings are sent to the same OID/queue as non-NDC PNRs.
- Service fees (TTM) cannot be processed on NDC records as of the time of publication.

Sabre

- Fulfillment of the NDC order is in development.
- Service fees (MISF) cannot currently be processed on NDC records, but they are actively working on it.
- Fare quotes for Air Extras/Ancillary Services (*AES) are not currently included in the NDC record when part of the order.

The quote for the order typically bundles the fare and Ancillary Services but separate documents are issued when the Order is fulfilled.

Travelport

- Travelport is still defining their solution. The specific capabilities may vary between Travelport+ (formerly known as Galileo), Apollo, Worldspan.

Enhanced Aggregation Tools

- NDC bookings are generally already fulfilled before the record is submitted for mid-office processing.



1.2.3 Payment

A ticket purchased through the EDIFACT-based GDS has the airline as the merchant of record but can take up to a week to settle because they are reported via ARC or BSP settlement plans, most of which process on a weekly basis. NDC transactions generally settle within a day or two since payment is made directly through the airline. Virtual card and other credit card payments for NDC transactions may have limitations in some BSP regions.



1.2.4 Itinerary and Invoice Creation

Itinerary and invoice documents are often referred to collectively as document delivery. These can be created for any combination of NDC and GDS EDIFACT segments if the order is placed within the same record. It can include any combination of active and passive segments. If separate records through different sources are generated for the same trip, there will be separate itineraries. This can create challenges in calculating total cost, which many corporate travel policies require.

Sabre

Sabre generates the DIN/interface to the back office automatically when the NDC order is fulfilled. If the agent fulfills the order before the PNR is sent to QC, fare savings, UDIDs, other 'file finishing' will likely be missing in the back office.

NDC PNRs do not have Fare Quotes or Air Extras/Ancillaries (*AES) when part of the order.

Travelport

Travelport is still researching its approach.

If separate records through different sources are generated for the same trip, there will be separate itineraries.



1.2.5 Processing Traveler-Generated Changes and Exchanges

Changes imposed by the airlines, like cancellation or schedule changes, are addressed in the Airline-generated Schedule Change section. Traveler-generated changes, such as a change in destination or date, require exchanging tickets. Exchanges for tickets originally generated through the EDIFACT-based GDS format, can be handled within the GDS environment without having to contact the airline. An NDC order, whether initially booked via the GDS, an aggregator, direct connect or a desktop system, currently requires a call to the carrier to process the exchange. The GDS acts as an aggregator for NDC bookings that are booked outside their systems, those segments are not actually booked in the GDS.

Processing travel-generated changes and exchanges is the same across all the GDSs.



1.2.6 Low Fare Search and Waitlisting

Currently, low fare search on GDS EDIFACT-based bookings compares the current Fare Quote for the trip to the new GDS price command/results for the air segments. Ancillary services are priced separately on GDS EDIFACT-based bookings. NDC Offers may include both trip cost for air and any Ancillary Services (i.e., seat fees, bag fees) combined into a single, bundled price. In the NDC age, airlines like American are cracking down on low fare searches ([AA Prohibits 'Automated Reshopping' in New Agent Passenger Rules](#), The Beat, 5/2/2023). Ancillary services are priced separately on GDS EDIFACT bookings.

Some carriers allow fare comparisons for alternatives within the same airline but there is no mechanism to compare across airlines. While these cross-carrier comparisons could be done within the GDS or Desktop systems, differences in ancillaries and fare bundles present challenges.

NDC carriers do not allow waitlisted flights. Only GDS EDIFACT bookings currently allow waitlisting, but these may be ignored by the carriers unless it is a First or Business Class booking. If Low Fare Search/Waitlisted flights are allowed, the reissuance would be labor intensive as the agent has to call the airline for NDC bookings as of the publication date. This would add to the cost of the transaction. It is uncertain how any low fare comparisons would work, even if airlines allowed it.

An NDC order, whether initially booked via the GDS, an aggregator, direct connect or a desktop system, currently requires a call to the carrier to process the exchange.

NDC carriers do not allow waitlisted flights.

There are also no fields for capturing reporting codes in the NDC record, so there is no place to track the comparison fare or reason code. These can be added in the passive PNR or trip records that the GDSs and some of the Desktop Aggregation tools create.



1.2.7 Unused Ticket Tracking and Processing

NDC carriers have realized a gap in the processing of unused tickets for NDC bookings. As of early June, AA and Accelya had produced a process to handle exchanges ([AA, Accelya Announce Fix To Exchange Unused EDIFACT Tickets In NDC, The Beat, 6/5/23](#)). While this is a good step forward, TMC's have identified it as being cumbersome, time-consuming and "too limited". At the time of publication of this paper, the airlines do not have a process or the infrastructure to allow third-party products to check whether the NDC order has been used. Tracking is back to a manual process and depends upon the traveler to advise the agency that they have cancelled or did not use the ticket.



1.2.8 Airline-Generated Schedule Changes

The major difference in EDIFACT-based bookings and NDC orders is that changes are automatically made and the ticket reissued without the traveler having the option to review and approve.

All segments are shown as HK (holding confirmed). Schedule change automation products determine the change type based upon the data found within the change flag notification and act upon it. Each carrier processes the change from its own endpoint. Automation can be applied to schedule changes for at least some carriers on all the GDSs as well as aggregators and Desktop Aggregation tools. Each airline must be certified for each source. The degree of automation must also be validated for each airline within each technology.

For example, the following table shows capabilities by change type within Amadeus's NDC [X].

NDC carriers have realized a gap in the processing of unused tickets for NDC bookings.

Legend

API
 Waiver Code Needed
 Not Supported

	QF	UA	AY	SQ	LO	AV	TA	2K	LR	QR	CX	AF	KL	BA	IB
Involuntary Changes/ Manual Sync	API	API	API	API	API	API	API	API	API	API	API	API	API	API	API
Automatic Sync for Flight Time Change	API	API	API	API	API	API	API	API	API	API	API	API	API	API	API
Automatic Sync for Flight Schedule Change	API	API	API	API	API	API	API	API	API	API	API	API	API	API	API
Automatic Sync for Involuntary Flight Cancellation	API	API	API	API	API	API	API	API	API	API	API	API	API	API	API
Automatic synch for cancellation due to payment time limit	Not Supported	Not Supported	API	API	API	API	API	API	API	API	Not Supported	API	API	Not Supported	API
Automatic synch for cancellation due to fake or duplicated names	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported	API	API	Not Supported	Not Supported
Automatic synch for voluntary changes or cancellation done directly with the airline	Not Supported	Not Supported	API	API	API	API	API	API	API	API	API	API	API	Not Supported	Not Supported
Automatic synch after no show	Not Supported	Not Supported	Not Supported	API	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported
Acceptance after involuntary change	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported	API	API	API	Not Supported
Exchange after involuntary change	Waiver Code Needed	API	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported	API	Not Supported
Cancellation after involuntary change	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported	API	Not Supported



1.2.9 Corporate Policy Management

Automated policy management tools may be applied to NDC orders captured within the GDS as long as the policy is checked before the order is fulfilled/ticketed. With some aggregators, the NDC order is fulfilled at the time of booking, which only allows a policy violation alert, not the ability to approve or decline the trip. In that sense, they operate like any NON-ARC/BSP transactions, such as some Low Cost Carrier bookings.

Mixed content-sourced bookings, whether they combine GDS EDIFACT and NDC-formatted records or NDC-formatted records from separate airlines, are recorded as separate transactions. This can have an impact on travel policy management, for example, policies based on total trip cost.

NDC direct connect and aggregators generally do not have access to corporate travel policy during the Offer/Order process and do not have reporting fields in the record. Most desktop aggregation tools and online booking tools can apply their policy engines so the user will only see what is in policy and can capture the appropriate codes if booking out of policy.



1.2.10 Reporting and Analytics

As long as the transaction can be captured (from the GDS NDC record or a file created by another NDC source/aggregator), the trip data can be included in reporting. Of course, data that is not in the booking record, such as low fare comparison for savings reports or policy exception analysis, cannot be reported. This affects subtotals, totals, and benchmark comparisons, as well as leaving empty fields in the transaction detail.

NDC records generally do not contain accounting or reporting codes such as department or cost center. These are generally added by the GDS, Desktop Aggregation tools, mid-office or back-office systems, but not by the NDC-content aggregator.

Records created within a single source can be passed as a consolidated trip to a back-office system and passed through to other third parties such as travel risk managers and sustainability providers. Records booked through multiple sources can be passed through as individual records but will not be recognized as a single trip. There are some technology providers working on solutions to knit separate records together into a single itinerary.

Records booked through multiple sources can be passed through as individual records but will not be recognized as a single trip.

A Path Forward

NDC has the potential to transform the way air bookings are sold and serviced, and be a win for everyone in the value chain, from travelers to corporate travel buyers, travel distributors, airlines and the many companies that support them. However, as the issues around economics, customer data and power-balance evolve, the ability to service NDC bookings is critical. And there is a lot of work ahead to get things running smoothly.

Understanding where servicing stands today, within a practical set of distribution models, is a great place to start. We hope our information and insights make a small contribution to that understanding.

We also hope this triggers constructive dialogue across the distribution and servicing spectrum to validate and update this information, and then to move on to the fun part – resolving the issues together and providing great travel experiences - profitably - for all.

Let us know your thoughts. As always, we're standing by to help.



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About DataArt

DataArt is a global software engineering firm that takes a uniquely human approach to solving problems.

We integrate our engineering excellence with deeply human values that drive our business and our approach to relationships: curiosity, empathy, trust, honesty and intuition. These qualities help us deliver high-value, high-quality solutions that our clients depend on and lifetime partnerships they believe in.

About Cornerstone

Cornerstone Information Systems is a leading provider of innovative automation for travel and expense technology solutions. With over 30 years of experience, we specialize in helping clients streamline their travel operations and procurement programs by increasing efficiency and providing data for quality decisions while delivering exceptional service.

We are consultative in our approach and committed to staying at the forefront of technology and industry knowledge while evolving our solutions to meet the changing needs of our customers and industry.