Amadeus Altéa NDC
Solution Description Document

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1. Introduction

The aim of this document is to provide a functional solution overview between Singapore Airlines (SQ) and NDC consumer as part of Altéa NDC

2. Solution Overview

Amadeus Altéa NDC solution relies on the IATA’s NDC standard and enables SQ to distribute its content to 3rd parties. This solution supports end-to-end NDC shopping via the ordering and servicing flows with Offer & Order management capabilities natively integrated with Altéa PSS.

As part of Offer and Order capabilities the following verbs will be implemented and used in the scope of this project (according to use cases that must be covered):

- AirShopping (to search and retrieve Airline Offers)
- SeatAvailability (to retrieve the seat map with seats description)
- OfferPrice (to finalize an Offer price taking into account the Frequent Flyer and Credit Card fees)
- OrderCreate (to create the Order from an Offer)
- OrderRetrieve (to retrieve an Order)
- ServiceList (return the catalogue of ancillaries)
- OrderChange (triggers changes and updates on the Order)
- OrderReshop (to initiate voluntary Order changes: cancelation, exchange)
- OrderCancel (to cancel an Order)
The below diagram aims to illustrate how a shopping to booking flow can be implemented between the SQ and the NDC consumer using the Altéa NDC verbs.

Figure 1: Illustration of a shopping to booking flow via NDC
3. Shopping – Offer management

The shopping and Offers computation are currently based on Amadeus Search and Shopping capabilities and each Offer includes a flight solution with included or at a charge ancillaries.

Shopping query results are stored at shopping time via “Offers” and “Offer Items” for a period of time covering the shopping window with a timeframe that is set-up by Amadeus.

The price of these Offers at shopping time is based on SQ filling and supports the public and private fares.

The availability will be checked but not secured until the Offer is confirmed (via OrderCreate), meaning that the Inventory is not blocked at shopping time.

3.1. AirShopping

The AirShopping NDC verb is called at the beginning of the shopping flow in order to request travel solutions associated to an origin and destination paired with fixed dates.

The 3rd party requesting can send the following criteria in the AirShopping request:

- Mono and Multi passenger Itineraries
- Origin and destination for a one way or round trip itinerary, multi destinations itineraries.
- Cabin preferences (up to 6 commercial fare families per request)
- Currency
- Dates of flights

Amadeus Altéa NDC returns in the AirShopping a description of all the created Offers based on the initial request:

- Offers Price
- Flight segment description
- Fare Family value
- In addition to each travel solution, up to 5 associated chargeable optional ancillary services can be returned (optional Offer items of the Offers)
3.2. OfferPrice

Once a travel solution is selected the Offer and its Offer Items need to be finalized. Amadeus Altéa NDC OfferPrice verb allows to finalize the Offer with further passenger and payment information.

The final price will be updated accordingly taking into account the applicable OB fees and Frequent Flyer discounts if the case. The Final Offer will be then ready to be ordered.

In return of the verb, the detailed price breakdown will be retrieved (price per passenger, tax breakdown, OB fees...).

The Amadeus Altéa NDC OfferPrice verb can receive as input the following data:

- Passengers type
- Frequent Flyer numbers (optional)
- Payment card information (optional)

3.3. Seat Availability

The Amadeus Altéa NDC SeatAvailability verb is called to return a seat map for the selected segment with or without the prices associated to the seats.

The seat map is interactively built, based on the airline’s inventory response. For chargeable seats, an additional chargeable characteristic ‘CH’ is returned in addition to the other seat characteristics defined in the airline’s inventory.

The seat map request polls the airline inventory to retrieve the aircraft cabin configuration, seat rows and columns, and seat characteristics.

The airline designates a set of characteristics for each seat, from a list of industry-standard PADIS codes.

Examples: K = bulkhead, L = legroom, E = exit row.

In addition, seats are designated as either being W for window, 9 for middle seat or A for aisle. Seats are also shown to be occupied, available, or blocked. Blocked seat rows can sometimes be unblocked for preferred agencies or frequent flyers.

Prices are returned on the seat map for any chargeable seats.

The booking of the selected seat will be done further in the flow with OrderCreate verb (when proposed in prime booking flow).
3.4. Service List

The Amadeus Altéa NDC ServiceList verb is called to return the SQ Ancillary Catalogue taking into account the context of the initial selected Offer (in the case of prime booking flow). All additional chargeable and exempted services are returned in this catalogue with price and description.

These ancillary services are returned and stored in the Offer as Offer Items and the selected services can be further booked via the NDC OrderCreate verb (when proposed in prime booking flow).
4. Order creation

Once the Offer selection has been done the booking can be finalized with the creation of the Order, using NDC OrderCreate. The creation of an Order can be done:

- Together with the instant payment and ticketing, in one step via OrderCreate OR
- The payment and ticketing done at a later stage (via OrderChange / deferred payment use case)

4.1. OrderCreate

The OrderCreate verb allows to finalize the shopping and ordering flow by booking the selected travel solution (Offer and Offer items) in the Order. This will be done via a dedicated “book from Offer” mechanism that supports price and content retrieval from the Offer.

By default, OrderCreate verb will orchestrate:

- The booking of the flights, seats and ancillary services
- The payment processing (optional)
- The issuance of the e-tickets and EMDs (optional)

4.2. OrderChange (deferred payment)

OrderCreate verb can also be called in a “deferred payment” scenario, in which case only the booking of the flights and ancillaries will be processed.

The verb OrderChange will be called afterwards to proceed with the payment and issuance of the accountable documents (e-tickets and EMDs).

In this scenario, OrderChange verb shall be called within the ticketing time limit defined by the SQ in Altéa PSS.
4.3. OrderRetrieve

The Amadeus Altéa NDC OrderRetrieve verb allows to retrieve a given Order and display its content.

The 3rd party needs to insert the Order ID in input of the OrderRetrieve verb in order to retrieve their Orders.
5. Payment

Airline merchant

Amadeus Altéa NDC is natively integrated with Amadeus Payment Platform to allow credit card payments.

The NDC consumer will insert the Form of Payment, amounts and credit card information in OrderCreate or OrderChange verbs.

Amadeus Payment Platform performs the authorization and capture of the credit card. The payment is collected in the airline account, the airline being the merchant of the payment.

NDC consumer as merchant

The NDC consumer will collect the money from the customer, then report the Form of Payment and amount information in OrderCreate or OrderChange verbs (cf. chapter 4 Order Creation).

The payment information is recorded in the Order and reported accordingly to the airline (cf. chapter 8 Reporting).
6. Servicing

6.1. Post-sale Ancillaries and Seats

Amadeus Altéa NDC covers post-sale ancillary and post-sale seat booking.

The context of the Order/booking can be retrieved after sale via the OrderRetrieve verb.

The upsell and display of the ancillaries and seats can be done:

- Via the SeatAvailability in order to request and return a seat map for a selected segment and/or
- The ServiceList verb that can be called to return the Catalogue of Ancillary Services

The OrderChange verb, when called the post-sale booking flow will allow and orchestrate:

- The booking of the seats and ancillary services
- The payment processing
- The issuance of the EMDs for these services

Figure 2: Illustration of a post-sale ancillaries and seat flow via NDC
6.2. Order Cancellation and Refund

Cancellation and Void of an Order

Amadeus Altéa NDC supports the retrieval and cancellation of the existing Orders via NDC OrderCancel verb.

Following an OrderCancel request, the cancellation will apply for all the passengers in the Order and the corresponding accountable documents (e-ticket & EMDs) are voided.

Cancellation and Refund of an Order

Amadeus Altéa NDC also supports and allows the cancellation of an Order and the triggering of an automated refund (if the Order is eligible to Refund).

Example of a possible use case: The passenger would like to refund and cancel his Order.

Currently, in the case services with EMD are present, queuing will be done to allow follow-up of these services by the airline.
An NDC OrderReshop has to be called in order to check and return the refund and penalty amounts for this Order. The corresponding total refund amount is provided in input of NDC OrderCancel.

It is possible to request partial cancelation per bound. The cancelation will apply for all the passengers.

Out of scope:
- Refund of services
- Partial cancelation - Cancelation for one part of the passengers

### 6.3. Voluntary changes of an Order

Amadeus Altéa NDC supports voluntary changes on the Orders coming from the 3rd party via the NDC channel.

Due to the native integration with the Altéa PSS, Amadeus Altéa NDC also benefits from Amadeus Ticket Changer (ATC) capabilities to automatically change the accountable documents associated to the impacted flight(s).

The main steps to perform a voluntary change to an existing Order are:
- The retrieval of an Order and display of the Order content, done via the NDC OrderRetrieve
• Returning the list of new Offers (including the new flights) to be proposed to the passenger. These will be returned via the NDC OrderReshop that relies on the ATC Shopper to return the new Offers.
• The final Offer with the balance of flights will be returned via the NDC OrderReshop. The calculation of the balance of flights is based on ATC functionalities.
• For a selected Offer, it is possible to retrieve the detailed information (i.e. price per passenger, tax breakdown, etc...) via another call to NDC OrderReshop, by inserting the targeted Offer ID in input of the call.
• The NDC Order change will support the finalization of this flow and change the Order by performing repricing and reissuance of the accountable documents (e-tickets)
• It will be possible to change all the “open” coupons

The following diagram summarizes the sequencing of the NDC verb to perform NDC voluntary changes on an Order:

![Diagram](image)

*Figure 5: Illustration of an Order cancellation and refund flow via NDC*

The voluntary changes of an Order will allow the re-shopping of flights for an already booked Order when changing origin-destination and/or date:

- for one or several bounds
- on all open segments of the tickets within the order
- for all passengers in the order
Currently, in case services with EMD are present, queuing will be done to allow the follow-up of these services by the airline (refund or re-quest services + EMD re-issueance / re-association)
7. Reporting

7.1. Standard reporting

The NDC “standard” reporting allows the sending of the NDC sales to SQ revenue accounting within the HOT file sent for the direct channel.

The HOT files sent to the airline revenue accounting contain the same level of information as the ones generated for other direct channels.

7.2. Reporting to BSP – NDC Link

The Amadeus Altéa NDC solution allows the reporting of sales to the IATA BSP via NDCLink. With this process, Amadeus Altéa NDC sends to IATA BSP, via dedicated link, a single RET file containing all the NDC sales of the SQ, for all markets (including market specificities). This allows the BSP to perform the settlement and financial risk guaranty activities.

Sales are reported with the IATA number of the agent which is selling via NDC, entered in the NDC OrderCreate/OrderChange messages (it may be different from the IATA number of the office used for NDC connectivity, especially in case of aggregator connecting several agencies via NDC to the airline system).

This is described in the below figure:

![Diagram](https://example.com/diagram.png)

Figure 6: NDC Reporting through BSP
8. Scope limitations and assumptions

The following assumptions apply for the current version of the Altéa NDC solution:

- Group bookings are not part of the scope. The maximum number of passengers that can be ordered is 9 (including infants)
- Child only (Unaccompanied Minor - UMNR) shopping and booking use case is not supported in the current release

9. Glossary

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<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>NDC</td>
<td>New Distribution Capabilities</td>
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<td>BSP</td>
<td>Billing and Settlement Plan</td>
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<tr>
<td>ADT</td>
<td>Adult Passenger Type</td>
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<tr>
<td>INF</td>
<td>Infant Passenger Type</td>
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<tr>
<td>CHD</td>
<td>Child Passenger Type</td>
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