NDC Pilot Program

2014 Pilots Consolidated Report

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Executive Summary

In 2014, there was a natural progression from the 2013 pilots, a greater number of deployments, expanding the scope and validating new scenarios. The key message is that the NDC schemas are fit for purpose. They support live deployments.

2014 Pilot Program Highlights

- IATA received learnings from 8 pilots VA, SC, HU, QR, AC, UA, YO, BA
- 3 airlines delivered live transactions - UA, SC, HU
- New scenarios validated - codeshare, travel insurance and mobile
- New NDC based solutions being deployed, leveraging the adoption of NDC by Solution Providers for both airlines and agents
  - Travelsky as both GDS and PSS, delivered SC and HU live on NDC 1.0
  - Amadeus as GDS delivered UA live on NDC 1.0
  - Datalex, HP, PROS group delivered the Swiss pilot on NDC 1.1.2
  - APG/Orchestra developing solutions with YO, including mobile and multimedia content
  - ATPCO/OAG demonstrating how an airline profile could work in NDC with AC

The Findings

Findings emerged around the themes of 1) project startup wins, 2) schemas, 3) handling rich content and 4) the offerID/offer management concepts - rich content and offer management already highlighted in 2013. In addition, one of the most common requests from new implementers is for illustrations of use cases via sample schema instances. These findings have been shared with the technical working groups\(^1\), the NDC Implementation Guide\(^2\) is being updated and the NDC Reference Architecture has been updated as a consequence.

2015 Focus

Learning points of pilots will continue to be shared with the technical working groups and the schemas refined accordingly. IATA will also publish case studies to share learnings from NDC projects to stakeholders across the distribution value chain.

In 2015, IATA is targeting a minimum of 8 live deployments using the latest NDC schemas and will continue to capture feedback from NDC implementers. In addition, now that a full end-to-end set of schemas are available, a number of pilots will be looking at deploying end-to-end scenarios. IATA continues to encourage the industry to share their NDC pilot or deployment learnings.

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\(^1\) An industry collaboration under the umbrella of the Distribution Data Exchange Working Group - consists of Airlines, Industry System Providers, GDS and Travel Trade representatives. This team is working on evaluating NDC business requirements, pilot findings and all other Industry reviewers' feedback, and enhancing recommended schema to build an even more robust NDC XML standard.

\(^2\) Implementation Guide: Section- Implementation support / Airline scenarios
Introduction

In a nutshell, New Distribution Capability will facilitate more efficient and comprehensive airline distribution in the travel agent channel through the development and market adoption of an XML-based data transmission standard for communications between airlines and travel agents. Using the NDC standard will enable airlines and the travel industry to transform the way airline products are retailed to leisure and business travellers as well as corporations. Widespread access to full and rich airline content will give customers the transparent shopping experience they desire. The foundation standard for NDC, IATA Resolution 787, was approved by the US Department of Transport on August 6, 2014.

This document focuses on the NDC pilot phase. This phase has as its overall objective to validate and enhance the business requirements and the schemas. Pilot participation is according to the NDC Pilot Terms of Reference, implementing various versions of NDC end to end Candidate Releases. Participants in a 2014 pilot responded to IATA’s invitation to share their NDC test and deployment findings with the industry.

This report is first intended for the members of the Data Distribution Exchange Working Group (DDXWG) - the group working on evaluating NDC business requirements, pilot findings and all other industry reviewers’ feedback. This is the feedback loop to fine-tune the schemas.

General Disclaimer: IATA has taken all reasonable care in producing and publishing the information contained in this pilot review. All information contained herein has been obtained through the consent of the Pilot participants.

The document is divided into three sections:

1. **Pilot Introduction**: This section introduces the work of each pilot, the NDC messages covered and a glimpse into what the pilots are saying about NDC.
2. **Pilot Findings**: This section presents detailed findings on each pilot then summarizes their findings in 4 broad themes, namely 1) project startup wins, 2) schemas, 3) handling rich content and 4) the offerID.
3. **Next Steps**: This section gives insight into the pilot/deployment focus for 2015.
1. Pilot Introduction

In 2014, IATA introduced the notion of a Live or Test pilot. All pilots intend to go live. IATA recognizes the value of the first NDC steps and learning points captured during the NDC setup phase have resulted in a ‘test pilot’. In a live pilot, the airline deployed NDC successfully in production where passengers were able to make a booking through an agent. These are marked below with the symbol .

1.1 Who are the pilots?

2013 pilots continuing work in 2014

**Swiss International Air Lines** in cooperation with HP, Datalex and PROS, is piloting the Shopping schemas in order to check their ability to support large transaction volumes. The pilot focuses on managing dynamic pricing requests and measuring response time, in real-life scenarios such as flexible date shopping, comparison-shopping, ancillary product shopping and personalized shopping. An agency GUI demonstrates these pilot scenarios. *New in 2014*: the test pilot performed these scenarios using the NDC1.1 shopping schemas.

**Hainan Airlines** in cooperation with CTBA and Travelsky, China’s global distribution and passenger services system provider, piloted the Shopping schemas in order to validate that the schemas support the distribution of their domestic air products through local travel agencies. Phase 1 of this pilot was validated in production in November 2013. *New in 2014*: Hainan airlines piloted the Shopping schemas for the distribution of international flight products, including codeshare. It also demonstrated the addition of rich content to domestic scenarios.

Pilots formed in 2014

**Shandong Airlines, Travelsky, Qingdao Huajun Air Service & Shandong Century Aviation** used NDC to offer aviation insurance ancillary sold through 2 OTAs, only available via NDC. This pilot deployed to live in June 2014. In phase 2 of this pilot, the airline added multimedia content related to its premium economy cabin to enhance the customer experience while shopping.

**United Airlines, US Based Amadeus Agents** – This live deployment distributes United Airline’s *extra legroom* seat product to US-based Amadeus agents using the NDC shopping schemas. This pilot deployed to production in June 2014.

**Qatar Airways** launched a pilot to cover the design of the NDC solution from a User Interface and Architecture point of view and enable Qatar Airways to make and manage NDC offers and orders. Phase 2 of this pilot will deliver ancillaries to certain Amadeus Agents in Q3 2015.
Heli Air Monaco, APG and Orchestra has as its pilot goal to create and distribute personalized offers through their web site and mobile apps, using customer profile & advanced search criteria.

Virgin Australia is piloting the Shopping schemas in order to evaluate the capability available for the distribution of rich content and of personalised offers. This pilot is also reviewing the proposed NDC security model in order to provide feedback on airline profiling, schema binding and finally NDC support for REST implementations.

British Airways is building a pilot to evaluate the v1.0 candidate release of the NDC shopping schema with a travel partner.

Airline Profile Pilot – Air Canada, ATPCO, OAG, FareCompare: implementing an Airline Profile created by Air Canada, stored and distributed by ATPCO and used by FareCompare.

### 1.2 What messages have the pilots deployed?

The list below shows messages already deployed by pilots using NDC1.0 or later.

All the pilots in this report are covering the functional area of NDC Shopping, supported by the following messages. Live pilots implemented a handover to existing schemas / processes to fulfil the shopping request.

<table>
<thead>
<tr>
<th>Message Type</th>
<th>NDC1.0 (October 2013)</th>
<th>NDC1.1 (October 2014)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AirShoppingRQ</td>
<td>CZ, HU, LX, NZ, SC, BA</td>
<td>LX</td>
</tr>
<tr>
<td>AirShoppingRS</td>
<td>CZ, HU, LX, NZ, SC, BA</td>
<td>LX</td>
</tr>
<tr>
<td>BaggageListRS</td>
<td>NZ</td>
<td></td>
</tr>
<tr>
<td>FileListRS</td>
<td>NZ</td>
<td></td>
</tr>
<tr>
<td>FlightPriceRQ</td>
<td>HU, NZ, SC, BA</td>
<td></td>
</tr>
<tr>
<td>FlightPriceRS</td>
<td>HU, NZ, SC, BA</td>
<td></td>
</tr>
<tr>
<td>SeatAvailabilityRQ</td>
<td>NZ, UA</td>
<td></td>
</tr>
<tr>
<td>SeatAvailabilityRS</td>
<td>NZ, UA</td>
<td></td>
</tr>
<tr>
<td>ServiceListRQ</td>
<td>NZ, LX</td>
<td>LX</td>
</tr>
<tr>
<td>ServiceListRS</td>
<td>NZ, LX</td>
<td>LX</td>
</tr>
<tr>
<td>ServicePriceRQ</td>
<td>UA</td>
<td></td>
</tr>
<tr>
<td>ServicePriceRS</td>
<td>UA</td>
<td></td>
</tr>
</tbody>
</table>
1.3 What Use Cases are the Pilots Covering?

Until November 2014, the schema available covered the shopping domain. All participants therefore are piloting either the NDC1.0 or NDC1.1 shopping messages.

Live deployments at the time of this report are depicted below with the symbol \( \rightarrow \).

<table>
<thead>
<tr>
<th>Pilot Airline</th>
<th>Pilot Focus</th>
<th>Ancillaries</th>
<th>Schemas/Messages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Swiss International Air Lines</td>
<td>Managing dynamic pricing requests and measuring response time with scenarios such as flexible date shopping, comparison shopping, ancillary product shopping and personalized shopping</td>
<td>Bundles including bags, seats, champagne and more.</td>
<td>* NDC1.1.1&lt;br&gt;* NDC 1.1.2&lt;br&gt;AirShoppingRQ/RS&lt;br&gt;ServiceListRQ/RS</td>
</tr>
<tr>
<td>( \rightarrow ) Hainan Airlines</td>
<td>International flights, including codeshare.&lt;br&gt;(Domestic flights, Deployed Nov 2013)</td>
<td>None</td>
<td>NDC1.0&lt;br&gt;AirShoppingRQ/RS&lt;br&gt;FlightPriceRQ/RS&lt;br&gt;ServiceListRQ/RS&lt;br&gt;integrated with existing Travelsky process to fulfil shopping transactions (i.e. booking and ticketing applications)</td>
</tr>
<tr>
<td>( \rightarrow ) Shandong Airlines</td>
<td>Shopping Aviation Insurance through their Travel Agents.&lt;br&gt;Deployed June 2014&lt;br&gt;Shopping flights, enhanced with multimedia content of their premium economy seat product. Includes mobile shopping.</td>
<td>Aviation Insurance</td>
<td>NDC1.0&lt;br&gt;AirShoppingRQ/RS&lt;br&gt;FlightPriceRQ/RS&lt;br&gt;ServiceListRQ/RS&lt;br&gt;integrated with existing Travelsky process to fulfil shopping transactions (i.e. booking and ticketing applications)</td>
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* Pilots have since decided to implement the latest version of the schemas released in 2015 (v1.1.3. This is captured in section 2 below.)
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| United Airlines      | Distribution of UA’s extra legroom seat product to US-based Amadeus agents. Deployed June 2014                                                                                                                | Undisclosed                           | NDC1.0
|                      |                                                                                                                                                |                                       | SeatAvailabilityRQ/RS
|                      |                                                                                                                                                |                                       | ServicePriceRQ/RS
|                      |                                                                                                                                                |                                       | integrated with NDC Baseline schemas to purchase and fulfill the seat order.                         |
| Qatar Airways        | Distribution of QR ancillary products to their pilot agents.                                                                                                                                             | Includes baggage and seat-related ancillaries | NDC1.1.1
|                      |                                                                                                                                                |                                       | AirShoppingRQ/RS
|                      |                                                                                                                                                |                                       | FlightPriceRQ/RS
| Heli Air Monaco       | Shopping via Mobile and website                                                                                                                  | A range of ancillaries including panoramic flights, private flights, limo transfers… | * NDC1.1.1
|                      | Advanced search functions                                                                                                                       |                                       | AirShoppingRQ/RS
|                      | Offer management with YO ancillary services and rich content                                                                                   |                                       | BaggageAllowanceRQ/RS
|                      | Customized offers based on the customer profile                                                                                                 |                                       | BaggageChargesRQ/RS
|                      |                                                                                                                                                 |                                       | FlightPriceRQ/RS
|                      |                                                                                                                                                 |                                       | FileRetrieveRQ
|                      |                                                                                                                                                 |                                       | /FileListRS
|                      |                                                                                                                                                 |                                       | ServiceListRQ/RS
| Virgin Australia      | The NDC security model, schema binding and support for REST implementation.                                                                    | N/A                                   | NDC1.1.1                                                                                              |
| British Airways      | Distribution of BA products to their pilot agents.                                                                                               | Undisclosed                           | NDC1.0                                                                                               |
|                      |                                                                                                                                                 |                                       | AirShoppingRQ/RS
|                      |                                                                                                                                                 |                                       | FlightPriceRQ/RS
| Air Canada           | The use of an airline profile to demonstrate / test the effectiveness of offers and manage scalability challenges.                               | N/A                                   | TBD                                                                                                   |

* Pilots have since decided to implement the latest version of the schemas released in 2015 (v1.1.3. This is captured in section 2 below.)
2. Pilot Findings

In this section, we first provide additional pilot details to give the reader a greater appreciation of the work of each pilot and the context of the findings shared. The details shared are in accordance with the permission granted to IATA. Secondly, we summarize the findings in 4 broad themes.

2.1 SPECIFIC PILOT DETAILS

Swiss International Air Lines (LX)

Pilot ‘Alpine’ brings together three leading global technology providers (HP Enterprise Services, PROS and Datalex) with SWISS International Air Lines to design and implement an NDC pilot to demonstrate integrated merchandizing, revenue optimization and fulfillment against the SWISS CRS/PSS for an agency point of sale.

Launched first in October 2013 this test pilot has fed valuable feedback into the technical teams3 – a significant contribution to the robustness of NDC1.1.x Candidate Releases made available in 2014 and 2015.

NDC Schemas used: NDC1.0 (2013) and NDC1.1 (2014)

NDC Shopping Messages:
- AirShoppingRQ/RS
- ServiceListRQ/RS

This pilot pursues two goals: (1) Validate the practical usability of the proposed NDC schema in SWISS’ context, including development of its own light-weight UI with message tracing capability, and (2) use captured production availability requests to simulate large-scale NDC shopping & merchandising traffic with seamless integration of SWISS’ dynamic pricing environment.

The participant roles are as follows:
- **Airline:** SWISS International Air Lines (LX)
- **Dynamic Pricing:** PROS
- **Seller:** Datalex User Interface
- **Aggregator:** HP

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Screenshot depicting the results of dynamically priced offers from Swiss:

This pilot demonstrates integrated merchandizing, revenue optimization and fulfillment against the SWISS CRS/PSS for an agency point of sale. Key functional goals include testing and validation of IATA NDC API, tailored and optimized dynamic airline pricing and availability; extensive shopping and merchandising features such as branded fares (fare families) and ancillary shopping (cross sell – a-la-carte). It focuses on demonstrating a high level of performance and scalability for extensive shopping across all sales channels.

“We are validating current NDC messages and contributing to the enhancement thereof in pursuit of the ideal passenger experience. “

**Hainan Airlines (HU)**

In 2013, Hainan Airlines along with Travelsky and CTBA concluded their pilot, verifying that the NDC schema supports their China domestic travel scenarios.

In 2014, the second phase focused on 1) adding rich content to the domestic travel shopping flow and 2) codeshare shopping scenarios. This is the first pilot to perform codeshare scenarios and completed successfully confirming that the NDC schemas support this.
NDC Schemas used: NDC1.0
NDC Shopping Messages:
- AirShoppingRQ/RS
- FlightPriceRQ/RS
- ServiceListRQ/RS

The screenshot below of the codeshare scenario shows the results of shopping Beijing Copenhagen as follows:
- PEK BRU Hainan Airlines operated
- BRU CPH Shandong Airlines marketed, Brussels Airlines (SN) operated

Screenshot of International Shopping of Code Share Flight

Once the customer selects the offer, it is integrated with existing processes to confirm and fulfil the shopping request. As the marketed flight in this scenario, Hainan Airlines had no technical coordination with Brussels Airlines. However, for future scenarios where HU would like to display rich content for SN, this will be necessary.

The pilot identified a few schema gaps in the AirShoppingRQ/RS and FlightPriceRQ/RS message pairs, which were addressed in the NDC1.1 version of the schemas.

This pilot will continue to migrate to NDC1.1 and extend the cabin seat display to international and other codeshare routes. It will also feature additional rich content displays.
Shandong Airlines (SC)
The Shandong Airlines pilot launched officially in January 2014, in collaboration with Travelsky and 2 Travel Agencies - Shandong Century Aviation and Qingdao Huajun Air Service Co. Ltd. Both agencies use the Travelsky Agent GUI. The pilot examined whether agents could sell aviation insurances successfully along with SC flights. Although the aviation insurance is a third party product, the airline has control over its distribution and pricing.

NDC Schemas used: NDC1.0
NDC Shopping Messages:
- AirShoppingRQ/RS
- FlightPriceRQ/RS
- ServiceListRQ/RS

The pilot was complete and in production from the 2nd Quarter 2014, concluding that although there were no specific nodes in the schema for the ancillary ‘aviation insurance’, the schema design supported this scenario with no issues.

Pilot Phase 1 – Message flow

This swim lane diagram distinguishes the use of the NDC messages to support the sale of accident insurance.
Pilot phase 1 - Agent Display

This screenshot highlights the Aviation accident insurance in the red frame. The agent GUI did not have this checkbox before the NDC implementation.

Phase 2

Shandong Airlines launched the new Super Economy Cabin product in the market in July 2014 with the Boeing 737-800 aircraft. The SC pilot team decided to expand the pilot and add rich content to coincide with its aircraft launch. Phase 2 was launched to demonstrate Super Economy Cabin multimedia content to travelers shopping for SC domestic flights.

The pilot team went further to implement NDC shopping via a mobile application. The mobile application development team only used approximately 20% of the data elements in AirShoppingRQ, for example, to keep the payload to a minimum. They showed that using a reduced dataset, it was possible for live transactions to be made from the mobile app.
Pilot phase 2 – Agent Display

This screenshot shows the rich content now available to travelers shopping for SC flights via the agents in this pilot.

United Airlines (UA)
The United Airlines pilot commenced over a year ago, in collaboration with Farelogix and Amadeus with the scope to distribute UA’s Extra Legroom seat product to US based Amadeus agents. This was deployed in June 2014 using the NDC Shopping 1.0 schema and is considered a success with the ability to distribute the extra legroom seats to these agents for the first time.

NDC Schemas used: NDC1.0
NDC Shopping Messages:
- SeatAvailabilityRQ/RS – for seat availability
- ServicePriceRQ/RS – for pricing the seats

NDC Baseline Messages for seat assignment and management of the seat order
- PNRCreatenRQ
- PNRViewRS
- PNRChangeRQ
- PNRDeleteRQ
- TicketEMDIssueRQ/RS – for seat purchasing
- TicketImageRQ/RS – display ticket

An extract of the high-level architecture diagram is below. The Host Services Gateway receives and processes APIs (including NDC) from their third parties partners, transforms them into the UA proprietary messages. The gateway also manages integration with processes such as pricing, seat map displays and
business rules for personalization etc., which are outside the host.

The prices for the seat are dynamically determined in the merchandising engine.

In this implementation, UA’s current requirement is for a ticket to be issued before processing payment for a premium seat and the payment type is credit card only. This is due to the fact that UA currently does not have EMD capabilities compatible with ARC/BSP settlement processing at this time.

*Note: “Open Axis XML” on this diagram represents the NDC Shopping 1.0*

Agent Display

The screenshots below highlight the changes before and after the NDC implementation.

**BEFORE**
The ‘green screen’ is still widely used by Amadeus agencies, however now there is added functionality to display a UA graphical seat map. From that graphical map agents can price and select a paid seat.

Below is an example of a seat map, after the implementation – it is laid over the classic seat map. The agent can bring this up with the SM2 command or by clicking a graphical seat icon.

**AFTER**

![Seat Map Example](image)

**Qatar Airways (QR)**

Qatar Airways’ overall objective is to deploy NDC in production i.e. making selected airline products available via the NDC standard to travel agents.

Launched in September 2014, phase 1 of establishing the project focused specifically on the architectural foundation to support NDC for future use.

Qatar Airways has selected Amadeus to be the partner of the pilot in order to implement NDC from a host perspective. A live deployment with Amadeus agents will complete the next phase of this pilot in 2015. This pilot will focus on showcasing the airline’s premium product across all cabins to travel agents, including the associated rich content.
The general approach is to 1) design the NDC solution from a User Interface and Architecture point of view, 2) setup the QR business rules to be able to make and manage NDC shopping messages. This ensures a robust foundation for deploying to production.

NDC Schemas used: NDC1.1.1

NDC Shopping Messages:
- AirShoppingRQ/RS
- FlightPriceRQ/RS

This pilot has already fed schema feedback into the working group. Some items have already been included in the latest version of the schemas, others still under review by the change management teams.

Pilot features

- Two use cases are supported – 1) Shopping of NDC flights and other airline products and 2) Shopping of NDC airline products as add on
- Amadeus has proposed the first User Interface for the pilot agencies to support the shopping process. The user interface is customized to integrate with the existing booking, ticketing and fulfilment processes using Amadeus internal messaging.
- Qatar Airways has facilitated this pilot without making many changes to their internal systems; the integration aspects are internal to Amadeus and the solution they have provided.
- For the pilot, QR will have a process to send the specific rich content to Amadeus.

Agent display – Search page (mockup)
The following is the mockup to view/request the three ancillary services for the pilot.
Heli Air Monaco (YO)
Under the leadership of APG and Orchestra, Heli Air Monaco is piloting the Shopping schemas with the goal to create and distribute personalized offers through their web site and mobile apps, using customer profile and advanced search criteria. These personalized offers will integrate some of the company’s luxury products such as limo transfers and panoramic flights and feature rich content.

The YO NDC pilot project is a proof of concept focused on the sale of ancillaries and
add-ons (for instance: hotels, transfers, piloted private flights, limos) and the technical design of a platform to support these. The pilot scope is NDC Shopping.

This test pilot is aimed at understanding the NDC schemas to determine the next concrete steps for Heli Air Monaco. This pilot will also validate that the NDC schemas support use cases for the direct channel before deploying to the indirect channel.

The NDC1.1 Shopping messages being validated are:
- AirShoppingRQ/RS
- ServiceListRQ/RS
- FlightPriceRQ/RS
- FileRetrieveRQ/RS
- BaggageAllowanceRQ/RS.xsd
- BaggageChargesRQ/RS.xsd

The following diagram is an illustration of the main message flow, however, for complex scenarios the additional messages are included.

These are 4 use cases that cover the following types of scenarios:
- Advanced search functions (for instance: door to door search method)
- Offer management with YO ancillary services (for instance: limo transfers, hotels, panoramic flight etc.)
- Customized offer based on the customer profile (for instance: exclusive helicopter flight for more than 3 passengers)
- Rich content management (for instance: pictures, text description for the ancillary services etc.)
A key strength of this pilot is in the disciplined approach to planning and deployment, giving the pilot team a clear idea of the challenges of development and integration.

Implementation considerations

- A caching system will manage the YO availability in the NDC platform and fares and schedules are managed directly in the NDC platform.
- The pilot will study more precisely the interactions between the NDC platform and the PSS in step 2 of the NDC pilot by taking into account performance aspects (especially for mobile application).

Virgin Australia (VA)

Virgin Australia chose the NDC Baseline schemas to support its change in business model from a low cost carrier to a full service carrier in 2012. They implemented the NDC Baseline schema and went live in January 2013. The NDC Baseline based API concludes its 2nd year of operation on the Sabre reservation system environment. The VA test pilot documents their findings and provides input into the NDC1.1 schema releases.

VA shared these key drivers (among others) for adopting the industry standard:

- Reduce (re)investment cycle for API consumers
- Increase alignment to industry practice
- Decrease design and architecture effort creating a custom data model
- Create flexibility without having to re-release new web service contracts
- Versioning of individual API functions

In addition to these points described below, VA provided detailed feedback on the schema, to address consistency, Java bindings, REST binding suitability. Feedback on the schema and security aspects has been fed directly into the technical teams.⁴

Security Aspects, contributed by VA

VA implemented WS-Security to secure their NDC deployment. On this specific aspect, VA’s feedback supports the decision to recommend the adoption of WS-Security (Web Service Security) as the proposed method for securing NDC Services (using SOAP and web services) and thus providing an end-to-end security model for NDC (as opposed to current point-to-point security model).

VA also confirms that compliance to industry standards (here we mean W3C standards such as WS-Security, WS-I) is paramount. VA’s feedback contributed to the NDC1.1 schemas being W3C compliant – to ensure interoperability with W3C standards such as WS-Security. They also believe there is much benefit of 1) having a README file that contains usage instructions including a list of

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external resources and 2) ideally a W3C compliant XML Catalogue file to be referenced by the design / developer tool to ensure all resources are appropriately referenced for schema validation and resolution.

There are a few interesting use cases for a REST interface, where a partner (e.g. an aggregator) consumes an airlines’ NDC API. The partner wants to use the airlines resource to deliver content to their mobile app. But since the mobile app is delivered fully to the client device the partner cannot embed their API key into the app (else any tech savvy user would be able to gain access to the API key and use it at their leisure without the partner having control over it anymore). The only interoperable industry solution for REST we have found so far is the HMAC (used by Google, Amazon etc.).

Transaction and Session Management Support, contributed by VA

Today the majority of reservation platforms have a notion of a user session. This notion allows a business transaction to be finalized in multiple steps. VA believes that in a distributed environment like NDC it will be important to have a defined process to span a user transaction across multiple content sources to allow a purchase with 1 or more content provider and ensure all purchases succeed as a whole or not at all.

Integration of NDC schemas with other systems or processes, contributed by VA

Each agent had different technology platforms and the schemas behaved differently depending on the technology used to build the wrappers. Care must be taken when defining Airline Requirements as Travel Agents may have very different needs. Understanding our audience was critical in the transition to the NDC Baseline schemas; the previous proprietary Virgin Blue API was operational for around 6 years and had seen many uses both internally and externally. The one defining factor to their business needs was to ensure that all types of consumers could execute business processes for their specific needs. VA found that different types of consumers used the web services quite differently and this understanding drove a few factors in the design and management of the API. For example, a developer portal was created in order to drive a deeper understanding with example workflows and service implementations to ensure that the right calls were being used for the right business need.

Air Canada (AC)

Airline Profile Pilot

The ability to identify NDC participants and the types of requests accepted by those participants is an integral part of the shopping process in order to make the requests between Sellers, Aggregators, Meta Search Engines and Airlines relevant and
efficient. This pilot is implementing a mechanism to determine the circumstances under which Air Canada will receive NDC queries from FareCompare. This mechanism will be an Airline Profile created by Air Canada, stored and distributed by ATPCO, and ingested and utilized by FareCompare.

The work of this pilot is tightly coupled with the work done in the Airline profile taskforce in the DDXWG (led by ATPCO). This taskforce has delivered the Airline Profile Business Requirements to PADIS which was approved at the September 2014 PADIS meeting.

**NDC Schema version:** TBD

**Applicable NDC Messages:**
- TBD
- Data Elements for Airline Profile (no existing NDC schema yet)

The objectives of the Pilot:
- To evaluate the effectiveness of elements in the Profile in controlling utilization and evaluating the capacity thresholds of the Profile
- Prove the ability to offer up solutions that increase sale conversion
- Ensure the accurate behavior of the Profile and systems
- Evaluate maintainability, robustness and ease-of-use of the Profile
- Identify any gaps in elements and share lessons learned with IATA

Success measures:
- AC will be able to control the volume and type of transactions through the Profile
- FareCompare will be able to determine where to perform NDC transactions (positively or negatively)
- FareCompare is able to prove that if AC’s profile indicates shopping transactions, then FareCompare is able to book offers as presented through shopping.
This pilot will continue with Integration testing and delivery of live transactions in 2015.
2.2 SUMMARY OF FINDINGS

In 2013, there were “three (3) main themes that emerged from piloting the NDC Shopping schemas around 1) building the offer, 2) schema availability and 3) connectivity. The results from the first pilot phase suggest that NDC adopters need to, at least, consider these factors in their planning.”

This section captures a summary of findings in 4 broad themes:

1. Project startup wins:
   - Observations during the setup of a pilot project that seemed to contribute to project success

2. Schemas:
   - Feedback around the implementation of the schemas and how they are being / have been addressed

3. Handling rich content:
   - Handling aspects of rich content in NDC implementations

4. Offer ID:
   - Feedback about the new concept in airline distribution

Theme 1: Project Startup Wins:

Pilot teams: Under the umbrella of IATA’s pilot program IATA plays a matchmaking role – that is, to help participants to identify other organizations who are also ready to pilot at that time. Compared to the pilots in 2013, in 2014 we played this role less, as players are starting to communicate more within their network.

- We found that the best synergies and faster time to market came from self-forming teams. Although IATA will continue to help with matchmaking, we encourage participants to find their pilot partners.
- Once the NDC certification process is launched in 2Q 2015, this will also help organizations identify the airlines, aggregators, IT providers and agents that are NDC capable.

Startup use cases: Pilot project teams had successes starting with simple scenarios. For example shopping air only then adding ancillaries, or shopping air plus 1 or 2 ancillaries before considering do air + non-air scenarios. They benefited from the initial learning from integrating with their existing systems/processes and it gave them something tangible to plan their next phase of deployment.

- Pilots start with use cases that make sense from their business perspective and their technology readiness. Breaking their pilot into phases to handle simple scenarios first helps teams learn progressively before taking on complex scenarios such as the end to end process.
Architecture framework and specification documents\(^6\): The NDC framework is flexible and each airline will make their own choices about how they use the schemas. Airlines are encouraged to develop technical and functional specification documents to guide the players that will consume its NDC API. For example, this could address aspects such as 1) a full description for each service (seat availability, service price etc.) and 2) explain how the airline implements each service, e.g. which data elements are used and how they are used.

In addition, during project startup, an architecture framework depicting the building blocks aligns players on their roles in the pilot. This was particularly useful when players such as system providers could have also potentially played roles that other providers in the same pilot were playing.

“The NDC Reference Architecture offers an architectural framework for planning and deploying NDC projects. It will help airlines drive decisions associated with their implementation of NDC. For instance, with an appropriate NDC reference architecture, airlines will be able to manage the expansion of NDC within their organization from pilot to comprehensive deployment and adoption.”  

NDC API Reference Guide\(^7\)

Theme 2 – Schemas
A significant finding from the pilots in 2013 was that the NDC 1.0 schema was not optimized for high performance. The feedback from these pilots was shared with the technical working group\(^8\) resulting in a more robust set of messages in 2014. Feedback from 2014 implementers confirmed that the schemas are now simplified with significant improvement in the architecture and overall performance.

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\(^6\) Though typical of IT deployments, these are called out because project teams that were disciplined in developing these, experienced smoother NDC projects.

\(^7\) Implementation Guide: Section- Implementation support / Airline reference architecture

\(^8\) An industry collaboration under the umbrella of the Distribution Data Exchange Working Group - consists of Airlines, Industry System Providers, GDS and Travel Trade representatives. This team is working on evaluating NDC business requirements, pilot findings and all other Industry reviewers’ feedback, and enhancing recommended schema to build an even more robust NDC XML standard.
NDC implementers shared the following:

**Migration to latest NDC schemas:**
For early NDC implementers, there will be costs associated with upgrading to the latest schema version (NDC1.1.3 at the time of this report).

- IATA will provide support for implementers who have deployed a previous schema version but migrating to a later version – i.e. once a new schema version is released, the following will support the conversion from the previous version.
  - A detailed difference / gap-analysis between current and former release directly from source code ("diff report")
  - A set of Altova MapForce files with the data mapping between schema versions
  - The respective XSLT files generated from the above Altova MapForce source files
  - Associated documentation / specifications

This will be available from 2Q 2015.

**Example of the data mapping**

Implementers found it more difficult to implement without sample to support various scenarios.

- IATA has captured this feedback: sample instances are now available in the Implementation Guide to cover scenarios such as 1) Airline end-to-end, 2) Airline partial process – aggregator ticketing and 3) Airline end-to-end Interline.

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9 Implementation Guide: Section- Implementation support / Airline scenarios
Theme 3 – Handling Rich Content

The NDC Standard enables airlines to transform the way their products are retailed – one key way is responding with rich content e.g. videos of the actual seat that the passengers would be sitting in, photographs of meals etc. The 2014 pilots generally had simple rich content scenarios, primarily retailing their seats products. As a result, a simple approach was used to manage and distribute rich content to their pilot aggregators or agents. This ranged from emailing a file to the aggregator with the URL or providing copy of rich content files. These airline pilots found no need for a content management system as the rich content was fairly static or limited in number.

However, there were more sophisticated scenarios discussed where solutions were not readily identified by pilots. There were questions around 1) storage, 2) management and 3) distribution of rich content i.e. supporting the following:

1) Airlines having different equipment types with different seat videos for each;
2) Photographs of meals where the meal cycles change per schedule;
3) Product differences by airport… etc.
4) At the implementation level, how should the airline construct the shopping response to maximize efficiency where the rich content varies per flight, service, offers, destination etc. Also, how to manage the meta data around the rich content.

One pilot considered a content distribution network (CDN) for global availability and redundancy aspects, however in general, content management is not a mature area for airlines. There may be benefit in looking into this topic in other industries. Although this is outside the direct scope of the NDC standard, guiding principles to handling rich content in NDC is a potential topic for the Implementation Guide.

Theme 4 – Offer ID

What the offerID/orderID concept aims to achieve is to have a conversation between the airline and the agent by reference, and is at the standard level. Implementers leverage this to ensure the management of the offers and orders remains with the airline. Pilot participants recognize the need to spend time in understanding offer and order management, including dynamically pricing an offer and integrating the offer ID and Order ID into today’s processes.

Implementers at large are eager to learn from others who may have already implemented this successfully. This is an area to be explored further by all pilots, especially as they progress beyond shopping scenarios.
3. Next Steps

In 2015, IATA is targeting a minimum of 8 live deployments using the latest NDC schema (NDC1.1.3 at the time of this report). We will continue to capture feedback from NDC implementers, especially in the areas of offer / order management, codeshare, handling rich content and mobile scenarios. In addition, now that a full end-to-end set of schemas are available, pilots are looking at deploying end-to-end scenarios. These learnings will continue to be fed into the technical working groups.

As we are now transitioning to the adoption phase of the NDC program, it is essential to foster and facilitate knowledge and experience sharing among the program’s stakeholders. Although there has been great progress in the industry’s overall understanding of NDC, there is still a need to provide concrete feedback how to best get started with NDC, based on real life situations experienced by early adopting airlines. IATA will be publishing case studies to support this knowledge sharing. These will enable stakeholders that wish to share learnings from their NDC project to do so with other airlines and industry stakeholders across the distribution value chain.

These airlines are in progress on the NDC1.1 schemas:
- Hainan Airlines, Shandong Airlines, China Southern
- Heli Air Monaco, Swiss Air, Qatar Airlines, Scoot, TUI Fly
- Air China, Aer Lingus
- Others