CONNECT **FAST**

Jet Messaging Technologies
bridging the gap

DELIVER **VALUE**

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CONNECT FAST

Connecting services of all kinds can be difficult. In the context of NDC we see these services as being one of two types:

- *Schema-based data definitions*. In this form of service data definition the basis is that of W3C Schema, provided either by a standard body, such as IATA or Open Travel (or indeed W3C-compliant bespoke Schemas)
- *Lightweight data definitions*. In this form of service data definition the basis is that of simple data elements, having simple types, and often designed to be used in a RESTful or Web Service context. Providers such as Uber, 15Below or Rome2Rio are examples of such lightweight service providers.

The connecting of Schema based definitions, one to another, presents quite some challenges. Firstly, the Schema definitions have to be "translated" into a form that can be used in real-world software project development processes. This translation ideally maintains full fidelity with the definitions, does not itself represent a "project" effort with time, cost and risk metrics to be wrestled with by the business management. Secondly, there is a need to "specify" the relationship between the various messages and types on one side of the connection with their counterparts on the other side. This, again, could be often the source of a "project" effort. Key success criteria for NDC adoption will be the involvement of agile "development" processes whilst still capturing the changing data definitions, containing as they do new business opportunities.

In what follows we focus somewhat on the lightweight form of connection, for reasons given below and especially since we are here focused on the NDC initiative, however, the comments are equally applicable to the non-lightweight, Schema-based form.

Lightweight Business Extensions

When thinking of connections, one that surely will happen is that of the airline extending its own internal business processes to embrace new business models, perhaps arising from new definitions from NDC. Being able to perform such an extension, connecting (RESTful or Web Service) services, without getting involved in heavyweight project considerations, with their attendant cost and risk elements, will be key to success. Agility and embracing change are key here.

Lightweight Information Services

A key value deliverable within an overall NDC implementation will be the provision of information to the connected travelling customer, wherever they are in their overall journey or experience. The same ideas as in the previous section apply here, agility and embracing change. The range of information providers could well be subject to change in general or as a result of the type of customer involved and where they are in their journey.

Lightweight Personalisation Services

Being able to engage fully with the growing ideas around personalisation will be a major activity with an overall NDC implementation. The platforms that provide a personalisation service could indeed be lightweight and external to an airline. As in earlier sections, agility and the rejection of heavyweight "project" ideas will be key to success. It is very likely that personalisation services will also need to connect with merchandising, dynamic pricing, offers and general customer relationship components. This personalisation idea, of course, spans air, hotel, car, insurance, package holiday domains.

Airport Shopping Services

When we think of an overall NDC-like customer journey or experience, one thing lacking it seems is insight that a customer can form regarding airports (or similar junction points) on the journey or within their experience. Today, understanding what "shopping" is available land- or air-side is decidedly lacking. Having airports provide lightweight services to their commercial tenants (for a fee?) and thence to an airline NDC capability, would fill this void. At time of purchasing the items for a planned journey, or indeed during it, the customer will be able to purchase items. Within this theme, naturally the link to specific airline lounges and customer facilities is in scope.

- Lightweight Business Extensions
- Lightweight Information Services
- Lightweight Personalisation Services
- Airport Shopping Services

API integration project times

standard API integration timelines

using JMT

75%
f a s t e r
with Jet Messaging libraries

DELIVER VALUE

In the context of an NDC implementation, it is one thing to describe, broadly, the role of connections in the coming new airline-customer-centric world, its another to suggest what the value of these connections would be. *Maximising the business value* of an NDC implementation hinges upon connections, agility, and the embracing of change and Customer. Here we highlight some of the key value ideas specifically in relation to the Jet Messaging proposition.

Real-world NDC Enablement
As mentioned above, one of the inevitable challenges with an NDC implementation is that of simply dealing with the Schema data definitions themselves. Two factors need to be considered here. Firstly, "translating" a given version of the Schema set (currently comprising almost 40 Schemas) and, secondly, keeping in line with the Schema sets as they change. In this latter regard it should be borne in mind that *change is very much in focus* with the overall NDC initiative. Being able to adapt the definitions as new business ideas emerge is seen as a key theme.
In addition, within the first factor, it is absolutely vital that the "translation" of the Schema set, essentially from text to code that can be used in a business application development environment, *minimises absolutely* the hand-work involved whilst at the same time *maximising the fidelity* of the output in relation to the original definitions (data validation, documentation). The current NDC Schema set is one that rests heavily on the W3C Schema language notion of Substitution Groups (in the same way as Open Travel OTA2.0 does). This compounds very much the task of "translation". With all these considerations it will be vital that a real-world solution to the "translation" problem be embraced.

New Ancillary Business Value
Given that we have secured means to connect in an agile way to the Lightweight service and information providers noted earlier, it seems very clear that the goal of an NDC implementation is to liberate the real earnings value in merchandise-related ancillary business. How and what is connected and what form the business model takes, would of course be only known on a case-by-case basis.

Innovative Customer Services
Given the central idea within NDC, that of The Customer, the precise services that are "blended" together, that reach out to the paying customer, will be a source of real revenue and hence business value. Adapting how and what services are in play, even at the "customer type", "customer value" or "customer loyalty" levels will be a key play in liberating such real revenue in a way that a mobile-savvy travelling public will appreciate and themselves "value".

Personalisation Loyalty
Personalisation and Loyalty are difficult terms to fully pin down in the case of a travelling customer. One key way, it would seem to keep engagement with a customer, as perhaps discovered by other merchandising platforms (such as Amazon) is to make "offers" that are really relevant to the individual paying customer. Of course, to do this, the overall platform needs to make sense of a range of metrics, not least of which is their buying habits, whether it's Flights, Cars, Hotels, Ancillary Services or whatever.

External Service Accessibility
The business value of an external service provider to an airline will vary case-by-case. Some service provisions will allow for adaption of the business model to cater for new ideas within the airline, whilst others will reach out to paying customers and therefore offer an opportunity for increasing revenue.

- Real-world NDC Enablement

- New Ancillary Business Value

- Innovative Customer Services

- Personalisation Loyalty

- External Service Accessibility

API development costs

standard develpment costs

using JMT library

100%
savings
in API development costs

YOUR SOLUTION

IATA/NDC Data Definitions

All the foregoing rests full square upon the use of the IATA/NDC Schema set. At present this set is in the order of 35-40 Schemas. It relies heavily on certain W3C Schema language features that will prove difficult for current tooling to handle, attempting to translate a Schema into something useful in a development environment. Additionally, the current tooling, even without considering the difficult W3C language features of NDC, only produce approximations in terms of meaning to that specified in the Schema definition itself. This approximation leads to a semi-manual process in which additional code is needed to provide closure on what is produced by the tooling. The very important topic of data validity, especially important when we consider users in a mobile "on-the-move" environment, must be implemented fully by hand in line with the Schema definitions as well as the primitive data definitions from the W3C organisation.

The Jet Messaging processor provides a *full translation of any W3C Schema to its equivalent code form*. This includes the difficulties that the NDC Schemas contain in relation to the Schema language itself. *The code produced is complete and no manual work is required whatsoever*.

Jet Messaging API Libraries

The Jet Messaging Libraries contain complete translation of all Schemas in the NDC set. The code produced includes documentation as set out in the Schema, the appropriate validation of data as specified in the Schema and the full set of W3C primitive types that are used in not only NDC Schemas but all W3C compatible Schemas. These libraries are a breeze to install and use by a developer, providing, in minutes, access to the full landscape of API types specified by NDC. The NDC libraries are readily maintained (re-generated) as versions of NDC Schemas change, no matter how frequently. These libraries can also be used in a Web Service scenario, playing alongside WSDL and a Schema set.

Jet Messaging Business Rule Translator

Making connection in a Schema-based or lightweight messaging world will be key in liberating key business value components. To effect this wide range of connection forms there is a need to provide a translation between one message form and another. Often, when this use case arises, it is dealt with by developing a bespoke component which is the focus of a "project". This represents significant time, cost and risk elements. Such an approach ends up as a sort of lock-in to a set translations between specific message forms. To achieve the target we have in mind for a real-world NDC implementation this approach must be jettisoned in favour of an agile approach. The Jet Messaging Rule Translator enters the picture, to provide a flexible and adaptable component. One key design attribute is the presence of "real" API types, available in the Jet Messaging libraries, functioning as run-time plug-ins to the core architecture. These plug-ins would also be for the lightweight message forms. Having a range of plug-ins that relate to various versions and services are easily catered for as well as configured at run-time. Another key feature in this translator is that the connection between message forms can be "governed" by business rules. No longer is it only a point-to-point solution but is now related to the content of the messages themselves. Importantly, the specification of these rules is performed by business people in the airline, no more "project" involvement.

Collaborative Innovation

To drive towards an agile, adaptable and valuable NDC implementation, Jet Messaging will work with it's customers as collaboration partners to jointly work on the following topics:

*   Development of the processor to provide Java output. This would provide packages for JAVA-based NDC projects.
*   The provision of JSON message forms from the library. This would enable the messages of NDC to be sent/received by an "application" in a JSON format in addition to the current XML.
*   The implementation phase of the Jet Messaging Business Rule Translator which is being designed.

We are also currently engaged in the design and specification of a Cloud-based service for our processor and are looking for a collaboration partner to support us in the implementation phase.

*   IATA/NDC & Open Travel Data Definitions
*   Jet Messaging API Libraries
    *   Ready-to-go & always up-to-date
    *   Agile with definition changes
*   Jet Messaging Business Rule Translator
*   Collaborative Innovation

NOW!
immediately available for IATA NDC messages

"Compared with the implementation of other XML interfaces, we estimate that we have achieved 75% time reduction in the communication protocol development cycle."

- Alfredo Malo, CIO of Avance Sistemas

OUR PROPOSITION

The basic proposition here is about enabling NDC implementations – Plug & Play.

API Development Cut by 100%
The tedious, semi-manual, low-fidelity process of "translating" the NDC Schema set (30-40 Schemas) is completely gone. You get the complete set of NDC API types, finished and ready to use in less that 10 minutes in the target application development environment. They contain full Schema-compliant data validation as well as business documentation (delivered to the application developer at coding-time) as defined in the Schema. The libraries also come with full technical documentation.

API Integration Faster by 75%
With the use of the Jet Messaging Business Rule Translator as well as both NDC libraries (at whatever version) as well as libraries for lightweight service providers, the target is to *very significantly reduce* the time and cost (as well as risk) of connecting an NDC message-based application context to a lightweight (or an alternative Schema-based) message context – NDC to 15Below, or NDC to Open Travel (or vice versa), for example. Not only are we designing to achieve this metric, but also to remove the need for airlines to involve themselves in setting up projects to design and develop a translation capability. Not only does the "project" idea have all the negatives aspects we touched upon above, but it also builds inertia into the architecture which is surely against the flow of an NDC-related architectural solution – agile, changing, adaptable, customer and value focused.

API Library Licenses With Immediate Access
Jet Messaging has generated libraries for NDC V1.1 for immediate download from our website. NDC V1.3 is currently the basis of developments in the processor. This version of NDC is planned to be available in mid-2Q2015. We will then produce libraries for any new versions of Schema set published by NDC.

In addition to NDC we have libraries for the following API's already in the library:

Open Travel (Air) 2013A, 2013B, 2014A, 2014B
Open Travel (Hotel) 2013B, 2014A, 2014B
Open Travel (Vehicle) 2013B, 2014A, 2014B
HTNG 2014A
OTDS v1.9
ISO20022

Base Licensing Model

Package Level	Innovator	Professional	Enterprise
Developer seats	1	5	20
Updates	✘**	3 per license year	Continuous throughout license year
Support	4hrs incl. €150 per additional hour	10hrs incl. €150 per additional hour	Unlimited***
Cost / Year	€ 1'500	€ 7'000	€ 25'000

*   As measured by a customer
**   Updates of libraries upon license renewal
***   Unlimited support, whereby the first 25hrs will be responded to within 24 hours, thereafter 5 working days

Base Licensing Model
Our base licencing model for API libraries is, by design, straightforward – Innovator, Professional or Enterprise - in relation to the developer seats involved, the updates catered for and the type of support involved.

We look forward to engaging with you to find a licencing solution that fits your specific needs.

ABOUT US

Jet Messaging Technologies provides world-leading innovative software components and products for software developers involved with W3C XML schema standards. We bridge the gap between those who define a schema and those who consume it in order to develop appropriate applications – i.e. we produce software for software developers to make their life easier.

THE VISION WE ARE DRIVEN BY

To bridge the gap between definers and developers, making the software development processes easier, more efficient and the output more reliable.

THE MISSION WE WORK AGAINST

To automatically generate ready-to-use, strong typed libraries, that provide a full-fidelity type landscape of the source W3C compliant XML schema definition.

BUSINESS BENEFITS

- Speed up development – Automate the generation of code related to the schema definition (that would otherwise be written, to one extent or another, manually) and thus saving the implementers time and money
- Reduce Bugs – Implementers can now consume the definition seamlessly and immediately, improving the quality of their software application product
- Make a better product – Embrace change and new business opportunities. Definers can now use the full power of the definitional language features in the certain knowledge that such definitions can be fully consumed by the business application development implementers

TECHNICAL BENEFITS

- Faster implementation of message related software components
- Lower cost of implementing message related software components
- Full conformance with the schema definition and thus low risk associated with non-conformance with the business definition
- Less ad-hoc time-consuming meetings to ensure definitional conformance
- Lower cost-of-ownership of message related software components over definitional changes
- A strong-typed type landscape opens up new software architectural possibilities

THE JMT PROCESSOR

The company's unique and disruptive innovation is the **JMT Processor**, an intelligent code generator that takes any W3C XML schema definition (e.g. SWIFT, ISO20022, SEPA, OTA, IATA NDC, NIEM, HL7, FHIR) as input and generates comprehensive libraries that can be used by software developers to create rich, interactive mobile and web service applications.

THE JMT LIBRARIES

Unlike other automated code generation tools, JMT Libraries correspond to the full XML schema definition, include embedded documentation and built-in validation, and they accurately represent complex sets of sequences, collections, extensions, and restrictions, all with full Intellisense support.

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