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Towards More Interline and Intermodal Connections

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Executive Summary

The gradual shift of travel distribution to direct channels has seen the decline of travel agencies that act to create complete itineraries on behalf of customers. As a result customers are forced to create their own connecting journeys. Many airlines would like to offer complete journeys, including other airline flights and other forms of transport to the customers who are now booking directly on their websites. Traditional airlines have well-developed processes for selling multi-airline itineraries but low-cost carriers and providers of other travel services are excluded from those processes. Even traditional airlines have problems in selling ancillary services as part of an interline itinerary.

This paper proposes the creation of a universal process for the booking transaction that may be used by any provider of travel services. The standard will be open and available to any entity that wishes to use it. It will deliberately not try to be completely comprehensive. Many edge use cases will not be accommodated but the corollary of that limitation is that implementation will be quick and simple. In this way adoption will be accelerated and the benefits of interline and intermodal sales will be realised much faster than by any existing proposed approach.

Introduction – Why Interline and Intermodal?

Very few journeys are capable of being completed using a single transport provider. Whether it is a round-the-world itinerary that requires multiple flights on different carriers or a simple short-haul flight for which the traveller has to get to and from the airports, it is almost inevitable that there will be more than one transaction to complete. When these transactions are as simple as catching a bus to the airport travellers usually take them in their stride but as things get more complicated most customers need some help.

In the past travel agents provided this help. A travel agent is a professional service provider who makes bookings and manages payments to multiple travel providers and presents them to the customer as an integrated package at a single price. The travel agent also takes responsibility for servicing the booking. This may involve communicating schedule changes to the customer or changing the booking if the customer's requirements change after it has been made. There are still travel agents in the market who perform these functions but their services come at a cost, whether that is in the form of fees paid by the traveller or commissions paid by the travel providers. In today's

[Towards More Interline and Intermodal Connections](#)



world there is a strong expectation that such intermediary services will be replaced by technology and be provided at a very low, or even zero, cost. Led by the original low-cost carriers (LCCs) the airline industry has pushed hard to establish direct sales of its services to consumers. This is very efficient for sale of a single company's product but it leaves the customer having to take the role of the travel agent in making separate arrangements for each stage of the journey. What is needed is a method by which one travel provider is able to make bookings and manage payments for the other providers along the journey. That way the customer only has to deal with one transaction and the travel provider is able to expand its offering and create a deeper relationship with the customer.

Traditional airlines have recognised this need for many decades and have created highly efficient methods for selling each other's services. T2RL's report "[Interline for the Modern World](#)", published in December 2020, describes in detail the interline process as it is today and some of the initiatives in the market to modernise this process and especially to include LCC's in the interline network.

Even if current initiatives were successful and interline sales and servicing between airlines became seamlessly efficient across all carriers there would still be shortcomings in the consumer offer. In today's world airline passengers may make part of their journey using other means of transport including rail, ferry, bus and private or rented car. They also use other services en route of which the most prominent is hotel accommodation. For any of these providers to offer the ability to book and manage a complete journey they need a form of universal booking capability. In the jargon of the industry they need to offer intermodal as well as interline services.

This paper will propose an approach to the establishment of a universal method of making and servicing interline and intermodal bookings – a universal booking process. It will acknowledge the work that has already been done by airlines, technology vendors and industry associations and consider the technical, commercial and organisational hurdles that must be overcome to achieve it.



Current State of Play

Apart from the traditional interline processes that have been around since the late 1940s there are three main avenues of development today. These are the latest IATA initiatives around the switch to a retailer/supplier relationship for interline sales, the initiatives being taken by individual suppliers such as Amadeus to facilitate interline sales between airlines hosted in one of its two platforms and finally the implementation of so-called virtual interlining by companies such as Dohop, Air Black Box and Kiwi.com.

The IATA initiative is moving at a pace that will be familiar to industry veterans. It is constrained by a requirement to achieve consensus amongst its members and by a culture that aims to cover 100% of requirements and possible situations. This approach leads to very robust standards but the time taken to achieve it is frustrating to many, especially those from the LCC tradition.

All the vendors of multi-host PSSs have the ability to facilitate interline bookings between their customers although this is often not actively promoted. Amadeus has recently extended that capability to allow cooperation between airlines hosted in its two different platforms, Altea and New Skies by Navitaire. This may be an important change as in the past companies like Amadeus that operate both a PSS and a GDS have tended to see the GDS as the right place to manage interline bookings.

It may be in the area of virtual interline that there is the best opportunity to expand the scope and reach of airlines. In many ways this represents the most pragmatic approach as it makes use of existing technologies and allows airlines to test the water at fairly low cost. There are already real-world applications of virtual interline in production including the Value Alliance in Asia which is facilitated by Air Black Box and easyJet Worldwide, offered in conjunction with Dohop. This latter is noteworthy as it has recently added its first intermodal connection with the German rail operator Deutsche Bahn.

Technologies

The fundamental technological requirements for interline and intermodal sales and servicing are that the booking systems for the parties to the transactions are able to exchange information about products, prices, availability and customers. In the traditional interline model, product and price information is predominantly published in

[Towards More Interline and Intermodal Connections](#)



advance in the form of schedules and tariffs. Availability of product may be managed by means of stored status or real-time queries while customer information is supplied at the time of the transaction.

Newer solutions are based on real-time exchange of information between systems that communicate with each other by means of Applications Programming Interfaces (APIs). This requires that the booking systems can exchange information in well-defined formats on timescales ranging from milliseconds to a couple of seconds. A generation ago this would have been the preserve of a small number of substantial players but thanks to the ubiquitous deployment of networks based on the Internet Protocol it is now within reach of virtually every business.

There is a variety of APIs that cover the requirements of travel bookings. These include the proprietary APIs provided by the vendors of booking systems and a number of others that have been defined by groups of like-minded enterprises. The most relevant of these are those defined by the Open Travel Alliance (OTA) and OpenAxis – which then formed the basis of IATA's New Distribution Capability (NDC). NDC has been under development since its announcement in 2012 and in the last couple of years has begun to account for a measurable proportion of booking activity for certain airlines although to date use of NDC in the interline arena has been very limited.

Capabilities

An essential capability for the use of interline and intermodal commerce is that of the provider's booking system to request information from an external system and to then act on that information and store the results of the transaction in its own database. Vendors of booking technology need to add that capability to their systems in order to take advantage of interline exchanges. In many cases this will require development work by the vendors or the purchase of third-party components – or both. The booking system needs to recognise when an end-user request cannot be satisfied by the provider's own services but that there exists one or more partner companies that may be able to fill the gaps. In those cases the booking system would invoke the methods defined to query its partner system(s) for the missing services.



There are three fundamental components of any booking transaction. These are Shop, Book and Pay. There is vast variation in the detailed implementation of these components but at their core the flow is as follows:

- Shop:** The initiating party queries the supplier for products that meet its criteria such as a flight from one location to another on a specific date. The supplier replies with information about the products it has available and their price.
- Book:** The buyer selects one of the offered products and submits the necessary customer information to enable the supplier to create a booking. It also creates a copy of the booking in its own database.
- Pay:** The buyer pays the supplier and the supplier acknowledges the payment.

Beyond the initial selling transaction there are two further capabilities that are necessary for the support of any interline relationship. These are:

- Service:** Changes are made to the booking as a result of a change by the supplier (involuntary servicing) or a change to the customer requirement (voluntary servicing). Voluntary servicing transactions may involve a further payment. Involuntary servicing may include a refund.
- Deliver:** Actions taken by a supplier to provide the product to the customer. Examples include the issuance of boarding passes and vouchers. In the specific case of interline airline bookings, a key requirement is to facilitate through baggage checking.

All of these stages apply equally in a B2B transaction between two suppliers.

Stating the required capabilities in this simple manner hides a great deal of complexity and it is in the face of that complexity that problems arise.

[Towards More Interline and Intermodal Connections](#)

The Problem with Defining Technology Standards

The traditional approach to defining technology standards involves groups of experts gathering to agree requirements and then writing detailed and prescriptive rules about how a product should function. It is sometimes done under the auspices of a government, in which case the defined standards may be legally enforceable, but more often takes place in the context of a body with common interests like IATA. In that case compliance with the standards may become a condition of membership of that body. This type of standard may be thought of as a *de jure* standard – one based on rules that must be obeyed with sanctions available for non-compliance. Creating a *de jure* standard can take a long time and soak up a great deal of resource. The more complex the product, the longer and more complex the process becomes. Furthermore the standards defined tend to become very inflexible because the process needed to change them also takes time and resources.

There is another approach to creating standards that is more efficient in many ways but may lack the ability to take into account a broad range of interests. This is the *de facto* standard created when a single entity provides a platform that is used by many others. The Windows operating system may be the most obvious example. Anyone in the world is free to write software that will run under Windows but to do so they must comply with the interfaces and capabilities of the platform. There is no sanction for not doing so except the fundamental issue that the software will only work if it is so compliant.

A middle ground also exists in which a small group of companies may agree a standard for use between themselves and publish it so that anyone else may choose to use it. The originating group may or may not impose a financial charge on others wishing to use the standard. This approach was broadly that taken by The Grocery Manufacturers of America and the National Association of Food Chains in the early 1970s. These bodies worked together to create the Universal Product Code which was embodied in the bar codes with which we are all now familiar. This was a classic *de jure* standard, but by publishing the standard and allowing it to be used across the world its use rapidly became truly universal. Its adoption as a requirement by WalMart when that chain started to sell groceries in 1988 ensured that almost every manufacturer in the world adopted it, with the result that process automation rapidly became widespread across the supply chain, reducing costs and improving efficiency for everyone.



The Pareto Principle

Selling travel is a complex business. T2RL's templates for the procurement of airline booking systems run to many thousands of line items. Every one of them is important to someone. When a body like IATA attempts to create a standard for inter-system cooperation its instinct is to try to accommodate all that complexity and cater for every possible set of circumstances that may arise. Given enough time this approach can eventually define extremely robust standards even if they are complex to implement and almost impossible to change.

The Pareto Principle is a phenomenon that is well known in economics and other social sciences. It states that 80% of consequences arise from 20% of causes and it has been observed to hold true in a wide variety of settings. Applying it to the challenge of airline sales we may expect that 80% of the objectives of an airline in its interline sales may be achieved by supporting 20% of the complexity in operations. For experienced airline managers from traditional airlines this idea is anathema. They are more used to the proposition that 99% or more of requirements must be met before a process may be considered implementable. Managers from the LCC tradition however may take a different view. If that 80% represents new revenue and it can be achieved at a low cost then why wouldn't they go for it? They may be leaving 20% on the table but they can worry about that once the four fifths of the benefit have been achieved.

A Better Approach

If there is to be significant take up of interline and intermodal business it is essential that there is a method of managing it that is widely available and covers the majority of requirements, without being so complex that it is inaccessible to a significant part of the market. There should be a minimum set of requirements for an interface between booking systems that will facilitate cooperation.

These requirements should be stated as a set of capabilities for the exchange of information pertinent to booking travel. They will be expressed in the form of structured messages built on standard internet technologies. Critically, they will not be tied to any specific implementation of a booking system and will allow travel providers and their technology vendors to innovate in areas such as packaging, pricing and delivery of travel products.

[Towards More Interline and Intermodal Connections](#)



The establishment of a constellation of users with these capabilities will create a universal booking network. Like the internet itself this network will not rely on a central server. Rather it will consist of a coalition of the willing. Travel providers and their IT vendors will support the necessary booking capabilities that use a compact set of messages to work with other participants in the following ways.

1. Requester - The ability to request information about available products.
 - It must be possible to specify the product required including dates of operation and other variable attributes like class of service
2. Responder - The ability to respond with information about available products including price and booking conditions.
3. Requester - The ability to select a product from the response and initiate a booking.
 - Information about the customer is passed at the time of booking creation
4. Responder -The ability to indicate that a booking has been made, provide a unique reference and request payment.
5. Requestor – The ability to make a payment and provide a unique reference to its own booking record.
6. Responder – The ability to acknowledge payment.
7. Responder – The ability to notify the Requestor of changes to the product that take place after the booking has been made.

It is important to recognise that the word “product” here includes any form of transportation between two points and also those additional services that transport providers wish to offer alongside the carriage of passengers. So-called ancillary products are increasingly important to airlines competing in today's world and any modern distribution network must take them into account.

This dialogue represents a minimum set of functionality that will be required of any system that is to participate in a universal booking dialogue. It will be completely open to

[Towards More Interline and Intermodal Connections](#)



any participant to create a bilateral arrangement with any other participant that extends this functionality as long as it is able to respond to the base level dialogue.

While this exchange essentially assumes that there will be bilateral relationship in place between requester and responder the messages would equally support a multilateral set of relationships. Information could be requested from more than one potential partner and responses aggregated to allow the selection of the best option from a range of possibilities. The intelligence needed to manage and orchestrate such multiplexed conversations would need to be built into the software deployed by the requestor.

Commercial Relationships

Just as with the booking dialogue there should be a basic standard commercial agreement. In many cases this will be superseded by existing interline and codeshare agreements but it will be available as a basic condition of participation in the booking network. The content of this agreement will provide that:

1. Any booking made and paid for as a result of the basic booking dialogue will be honoured by the Responder.
2. The Requester will pay the price specified by the Responder.
3. The Requester will be free to pass through the price to the end customer, mark it up, discount it or waive it entirely. None of these actions shall affect the payment from Requester to Responder.
4. Payment will be made in real time or on a daily scheduled payment cycle. It will be made in the currency specified in the product offer response.
5. In the event of problems such as missed connections the Responder will take responsibility for service recovery on the same basis as if the customer had booked directly.

In the case of airline connections, points 2 and 3 taken together imply that pricing will be based on sum of sector fares rather than through fares. However nothing in the dialogue

[Towards More Interline and Intermodal Connections](#)



will prevent any pair of partners agreeing bilateral rules for combining their prices according to whatever agreement they choose to make.

Management of payments requires further study and will depend on the capabilities of payment providers and any legal constraints that exist. The basic principle will be that as far as possible, customers will make a single payment and the travel provider that receives it will remit appropriate sums to its partner companies as soon as it is in possession of cleared funds. The traditional airline interline process of the ticketing airline holding the funds until after the flight(s) have operated *will not apply*.

Connectivity

The participants in the universal booking network may connect their systems using direct connections or by use of an industry message exchange.

The booking dialogue will be based on a subset of IATA's NDC messages. However the use of fields within the messages will be restricted to those that are essential to support the basic booking dialogue. Participants in the network will be at complete liberty to bilaterally agree to use the full NDC message between themselves provided they are always able to support the basic dialogue.

The minimum message set that is required to support the universal booking dialogue outlined here is as follows:

AirShoppingRQ and AirShoppingRS

OrderCreateRQ and OrderViewRS

OrderChangeRQ and OrderChangeNotifRQ

These messages as defined in the IATA NDC standard are large and complex. For the purposes of the universal booking process it will be necessary to agree that many of the fields within the messages will be optional and only a very limited amount of core data will be mandatory.



A Note About IATA

In the development of the thinking behind this paper we have repeatedly referred to IATA's role in developing the de jure standards that underpin existing connectivity in the airline industry. We have commented on the difficulty of creating such standards in the enormously complex world in which airlines must operate. To some extent we are proposing to cut across the IATA processes in order to deploy a “good enough” solution that airlines and other travel companies can deploy and build upon in the future. This should not be taken to imply that the role of IATA is unimportant or will be superseded. The experts convened by IATA will eventually deliver solutions that close the gap from 80% to 100% of necessary functionality and indeed will build new functionality that is not even a requirement yet. This is the reason that this paper proposes using IATA's NDC messages as the basis for its exchanges – albeit streamlined versions of those messages. By using this architecture it will be possible for the basic capability discussed here to be enhanced to full NDC and ONE Order capability for those who wish to make that investment, while creating a low-cost entry level solution capable of being distributed widely and easily.

IATA has recently published a short paper on the subject of virtual interline in which, true to form, the organisation lists a number of ways in which it does not meet every use case in the interline requirement. This illustrates the need for pioneering activity to take place outside the IATA framework but with a view to eventual convergence with IATA standards when they are ready.

In short there is no suggestion of replacing IATA standards. Rather we are proposing an approach that is complementary and one that will develop in parallel with IATA's efforts over the coming years.

Governance

Take up of the universal booking dialogue will depend on there being no licencing or royalty charges for use of any of the message standards. The standard will be maintained by one or more of the technology companies participating in its implementation. A technical group will be created to manage the standard. Membership of the group will be open to any technology provider with a legitimate interest in the network who will share any costs involved.



The time needed to define the initial message set must be limited. Based on the Pareto principle participants need to acknowledge that not all use cases will be accommodated.

Use of the booking dialogue will be open to any company that wishes to participate. Responsibility for managing any restrictions on interline relationships such as those created by government embargoes will strictly lie with the users of the network. The message standard will not attempt to do this.

Call to Action

T2RL believes that the universal booking process is a viable initiative that has the potential to greatly increase the value of interline and intermodal commerce. We would like to see one or more of the technology companies in the field create and publish a schema to support the basic booking dialogue. If two or more technology companies wish to cooperate on such an endeavour T2RL is prepared to facilitate an initial meeting and conversation between them.

Any technology provider working with the travel industry that wishes to participate in this initiative should contact T2RL on interline@t2rl.com.



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