Industry Direction for Open APIs
A Discussion

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I am excited by the possibility of innovative data sharing to enhance the customer experience in the aviation industry and to bring it to market much quicker than we could have ever thought in the past.

Open APIs are a key building block for the current and future needs to share data between companies involved in the transportation value chain and promote essential innovation for airlines.

We are at the early stages of this journey, with only 26% of airlines and airports so far offering access to their APIs according to the IATA survey, it is important that we act now to ensure that we have an "industry standard" approach in the form of best practices, as we expect 71% of the industry to have some form of Open API in place by 2020.

The purpose of this document is to continue to raise awareness and promote discussion to ensure that we can make the best recommendations possible. In 2018, this initiative will move into the **Passenger Service Conference** where we can put in place the industry framework for Open APIs in order to promote sharing of data across the industry.

Open APIs are a way to share data between entities in a trusted, timely and yet open manner. As example, the need for airlines and airports to share data is getting greater every year. Initiatives such as Artificial Intelligence, Customer Personalization, and real time operations need relevant, trusted, and timely data to operate.

Open API connectivity enables innovation to thrive by opening up travel companies data to the external world. This open consumption enables many developers to build creative solutions which would not be possible to build alone.

We will see a significant increase in usage in Open APIs in the next 3 years. By 2020, over 65% of airlines and airports surveyed will publish some open APIs, up from 26% today[1].

This document aims to promote discussion within the aviation industry regarding Open APIs and how we can adopt this approach to sharing data to benefit the industry as a whole.

[1] IATA industry readiness survey, See Chapter 4.

The airline industry is well aware of the need to share data in a trusted, timely and efficient manner. The need to share data is not going to reduce, especially with the increasing data sharing needs from new technologies such as Artificial Intelligence, Internet of Things and increased safety and security requirements.

In particular, a report commissioned by IATA, found, "*A more open approach to data and interoperability at a global and industry level may be more positive for the industry and for consumers.*"[1]

3.1 Why Open APIs for the Airline Industry?

Application Programming Interface provides a way for developers to interact with and consume a service.

It is a way for an external party to use (consume) data from an entity in a controlled manner. The fundamental difference between an Open API solution and a regular interface is that the unknown entities can consume this data by just registering.

This will open up the possibility for data usage across many channels and will enable both business (B2B) and consumer (B2C) usage.
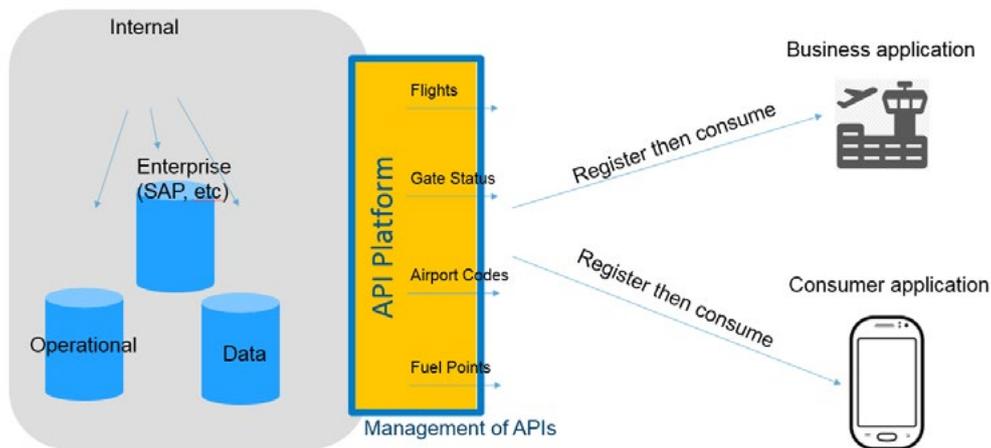

Figure 1: Example of a possible architecture: data is made available from internal sources and exposed via an API capable of being consumed in both a B2B and B2C environment.

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[1] Source: Recommendation 13 "Future of the Airline Industry 2035" published in 2017

3.2   What is an API?

Let us start by first understanding what is an API before we address the 'Open API' issue.

An analogy is useful in illustrating what this really means. Consider a service that everyone consumes every day - electricity. Electricity is delivered to consumers by a utility company. The utility company provides a service (electricity) to consumers that is accessible through electrical sockets. These sockets vary from one country to another, limiting access to only those consumers with the correct plugs for that socket.

In this case, the plugs are essentially consumers that are gaining access to the electricity and are only able to make use of the service if they have the appropriate authorization, in other words the correct sized plug to fit the socket. In this case, the API is the socket itself. Acting like the gateway between the services (in this case electricity) and the consumers (in this case the plugs) providing consumers access to services through various interfaces depending on their credentials. In addition, consumers can utilize the services they receive and implement them in their own way.
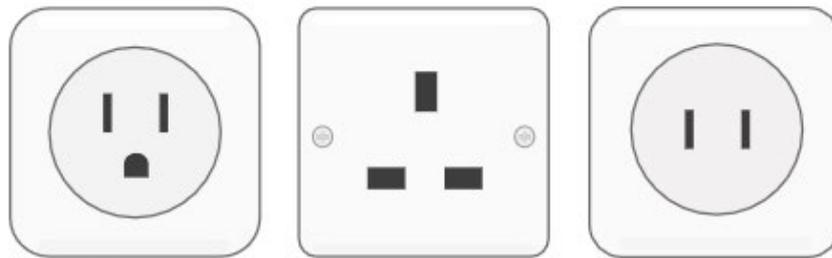

Figure 2: Think of the electricity plug sockets like the API. That is the gateway connecting the plug to the service provider (the electricity utility).

Within the airline industry we are trying to make sure every airline has the equivalent of "an electrical socket" and that this electrical socket is the same globally for the data definition and connection approach.

Simply put, the API is nothing more than the gateway for the consumer of a service to the provider of that service.

3.3   What does 'OPEN' mean in the term 'Open API'?

The label 'Open API', is a technology industry standard phrase, however it creates confusion by using the word "open". Hence we will try to eliminate that confusion by describing what we mean by an Open API solution.

Open vs Open

Open API does not necessarily mean it is open for everyone to access. There are three different methods of opening up the data for consumption:

- Public: anyone can subscribe to the data service, and once you approve that subscription, they have access.

- Private: invitation only is where you only allow invited parties to subscribe.

- Internal: the data service is not exposed outside of your enterprise, but rather a method for one internal system to consume data from another internal system.

Open versus Free

Open refers to the access methodology, in particular it is opening up the data for an external party whom we don't know. The revenue model for a data service is an independent component to the connection type. Open does not necessarily mean free to everyone. An entity behind the exposure of the API may additionally have a commercial model behind it. It depends on their own commercial policies.

Open versus No Control

Just because the connection is potentially available to external parties, does not mean that there is no control over your data. On the contrary, a modern API platform will provide the control mechanisms to ensure there is adequate control over the consumption of the data. Specifically the Open API platform can enable control over:

- usage,
- volume,
- who has it,
- when they have access, and
- security.

Open versus What Data

Open does not mean that carriers should allow access to all of their data. On the contrary airlines should consider measures that support their ownership of data to safeguard privacy and ensure common data protection procedures. Whilst some data may be considered to be generic in nature, carriers should ensure that personal data is not arbitrarily shared with unknown entities.

3.4 The Digital Transformation Imperative

Many industries are in the midst of an unprecedented phase of digital transformation. Hospitals are extending care beyond the hospital ward; non-bank players are driving innovation in the payments space; media companies are distributing content across multiple channels and partners. These changes are irreversibly reshaping industry boundaries and business models and, in the process, changing the winners and losers across verticals.

The aviation sector too is also under pressure to have better access to trusted and timely data.

Technology is the critical enabler of digital transformation. Mobile and cloud technologies, for years viewed as trends on the horizon, are now proven drivers for I.T. – enabled business disruption, both inside and outside the enterprise. APIs, once seen only as a tool for programmers, is also providing new routes to the market as well. Business and I.T. leaders must act now in order to ensure their businesses stay relevant and competitive. Customers have the means to quickly identify and switch to companies that can better meet their needs, and businesses who do not act now will be left behind However, digital transformation is not easily realized. It is certainly not the result of implementing a single application or a single technology. Rather, digital transformation can only be achieved when organizations are able to bring multiple technologies together to create truly distinctive and differentiated offerings. In order to do so, they must bring data from disparate sources to multiple audiences, such as to customers, suppliers and employees.

Ultimately, connectivity is not only a critical enabler of digital transformation, it is arguably the biggest differentiator of success. Despite its importance, far too many organizations are not approaching connectivity with this strategic mindset. Either, it is not a consideration at all — think lines of business heads driving credit card purchases of Software as a Service (SaaS) applications, without reflecting on how they will connect those applications to their underlying Enterprise Resource Planning (ERP) systems — or too often it is only considered with a short-term approach, choosing to value the success of an individual project rather than focusing on the broader strategies for the enterprise as a whole.

Traditional methods for integration applications do not work for digital transformation. These approaches, designed at a time with fewer endpoints and slower delivery expectations, often cannot move at the pace today's business requires. Just as digital transformation requires companies to embrace a new set of technologies, so they must embrace a new level of connectivity.

"We see that APIs are a core capability for us to achieve our digital transformation efforts"

Glenn Morgan
Head of Digital Business Transformation
International Airlines Group (IAG)
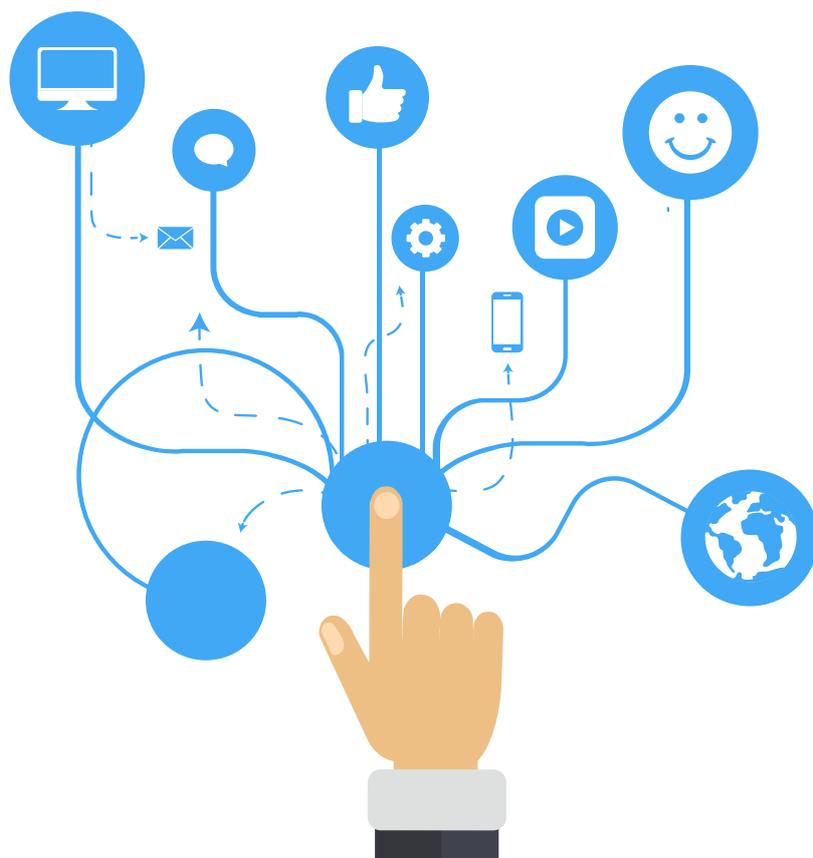
3.5 Why existing connectivity approaches are at risk

The technologies underlying digital transformation have enabled companies to engage with their stakeholders in new and innovative ways. These technologies, notably SaaS, mobile and IoT, have dramatically increased the number of endpoints to connect to. Where once an organization may only have had to consider its internal systems, it must now consider an exponentially larger set of endpoints both inside and outside the enterprise. For example, financial payment transactions previously carried out by the physical presentation and handling of bank checks, are now transacted by an expanded set of channels — including telephone, online and mobile banking and other emerging forms of payment.

Moreover, the frequency with which these new systems change has also increased. For example, whereas the database schema of an airport operations system may change only on an annual basis, the requirements of the online and mobile consumer applications connecting to those systems may change weekly, daily or even hourly. It is this speed of innovation that is a defining characteristic of digital transformation and I.T. must strive to enable rather than hinder such change.

I.T. leaders must meet two seemingly contradictory goals: they must ensure stability and control over core systems of record, while enabling innovation and rapid iteration of the applications that access those systems of record. This is the challenge now variously referred to as bimodal or two-speed I.T.

Existing connectivity approaches may struggle to meet the needs. A new approach is required, one that leverages existing investments, and enables I.T. to seize the moment to drive transformational change; one that enables agility, yet also allows I.T. to maintain visibility and control. This change is a journey that requires shifting I.T.'s mindset away from project delivery and positioning it to delivering assets as services, enabling the I.T. supporting the lines of business to self-serve and build their own connections, processes and applications, while Central I.T. governs access, service level agreements and data quality. In short, I.T. has to become a platform for the business.

"APIs are critical to enable agility and innovation, provide us with a competitive advantage, enable us to extend our reach in a digital indirect channel and deliver a seamless personalized passenger experience"

Stuart Birrell
CIO
Heathrow Airport

4.1   Airlines Implementing APIs and Open APIs

IATA conducted both desk research and performed an industry survey[1] to identify the number of airlines having Open APIs. Desk research was done by reviewing the web-sites of all of the 275 IATA Member airlines to determine whether they had a link to Open API content.

Based on this desk research, we found that ten airlines are currently providing Open APIs, which translates to less than 4% of all IATA Members. Interestingly though, the total market share of these same airlines is 16% measured by

RPKs[2] showing that it is some of the larger airlines which are currently providing Open APIs.

Based on the industry survey, 39 out of the 64 respondents representing 60% of airline responses have also built APIs but have not exposed them yet to the public (they are currently closed APIs). In these cases therefore, it may not necessarily be the technology investment which is restricting airlines deployment of Open APIs.
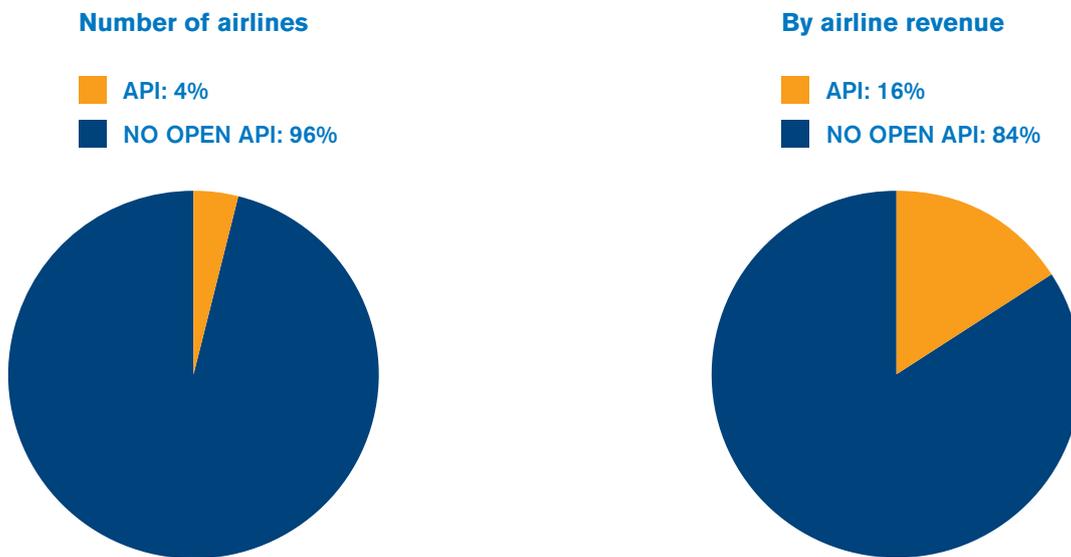
Number of airlines

- ■ API: 4%
- ■ NO OPEN API: 96%

By airline revenue

- ■ API: 16%
- ■ NO OPEN API: 84%

Figure 3: IATA's desk research shows less than 4% of Members equivalent to 16% of total market revenue by KPIs offer Open APIs.

[1] In addition to IATA's desk research, IATA performed a survey during the period June – August 2017 by phone, and in person. Results from 64 airlines and 35 airports were collated.
[2] Source: IATA Economics

4.2   What Content is Provided by the Carriers offering Open APIs?

From the desk research we have classified the content provided by the 10 airlines into 5 categories,

- ▪ Reference data,
- ▪ Offer Management,
- ▪ Order Management,
- ▪ Journey Management,
- ▪ Customer related data.

Reference data and Offer Management are the most popular data sets currently on offer with 9 out of 10 of the airlines offering this content. The least popular category with two airlines is Customer Related Data.
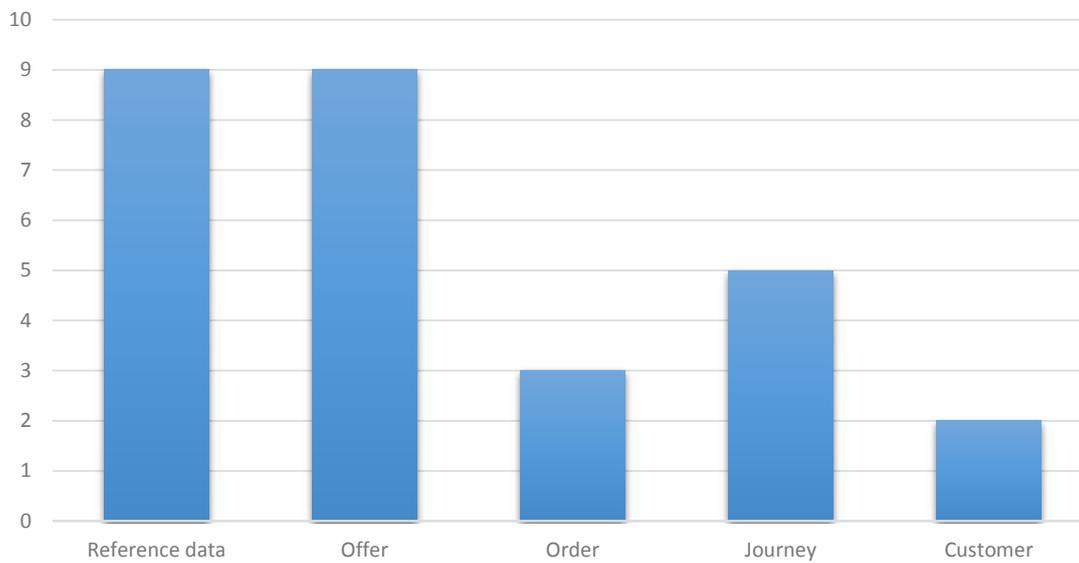
Data exposed via Open API

Figure 4: Reference Data and Offer Management Data is the most popular.

4.3   What are the Future Plans for Open API Deployment?

From the survey results this question provided a very positive result. Over 70% of respondents both airline and airports said that they plan to provide Open APIs by 2020. This implies that there will be some significant investment into this area over the next 3 years. 46 airline respondents stated they will provide Open APIs by 2020.

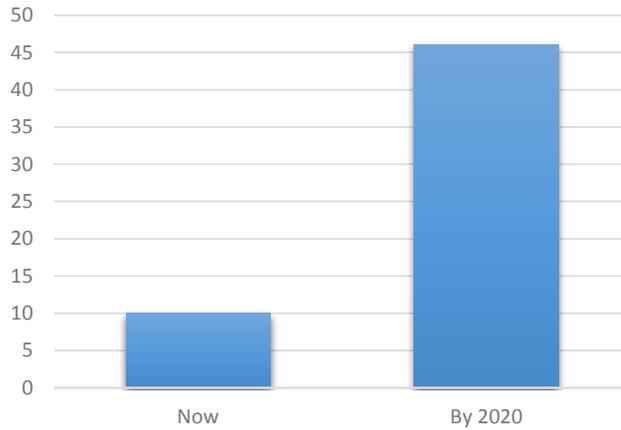### Number of Airlines providing Open APIs

Figure 5: Forty six airlines are planning to deploy Open APIs by 2020 compared to 10 today.

The most popular content which airlines plan to offer by 2020, includes flight schedules, baggage tracing, flight status and flight offers/prices. These items are consistent with our proposed first use cases discussed in Section 5.2
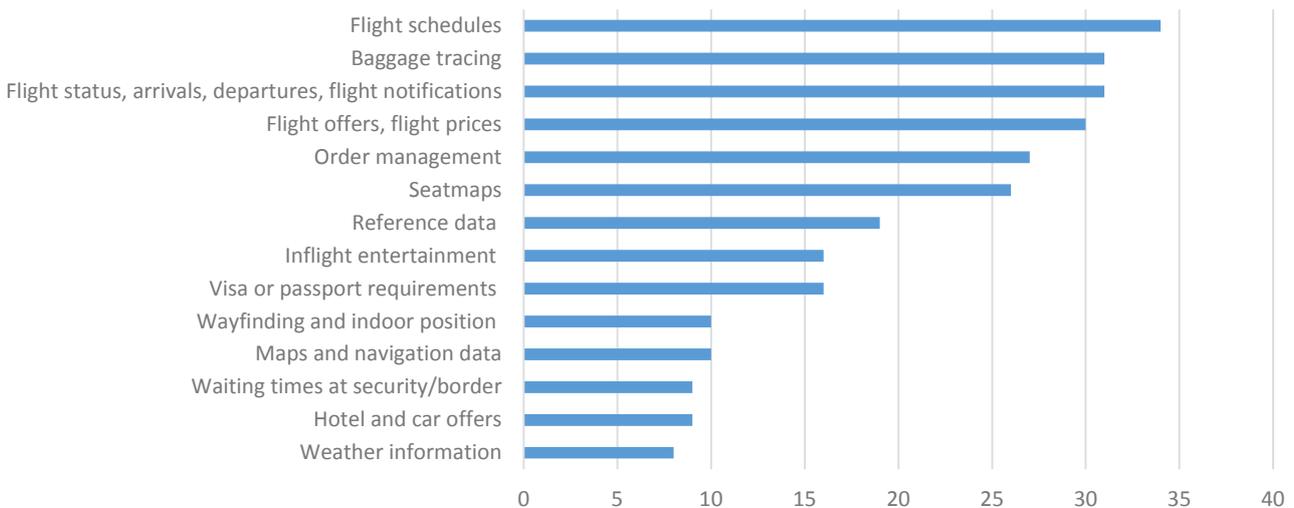
Content proposed to offer

Figure 6: From our survey airlines proposed to offer a variety of content via Open APIs.

4.4 Expected Benefits

One of the questions asked in the survey, was to identify what the future benefits an airline or airport hopes to achieve from the Open API initiative. The first and third highest future benefits was associated with cost and time to market, whilst the second highest was related to the ability to share data in a trusted way.
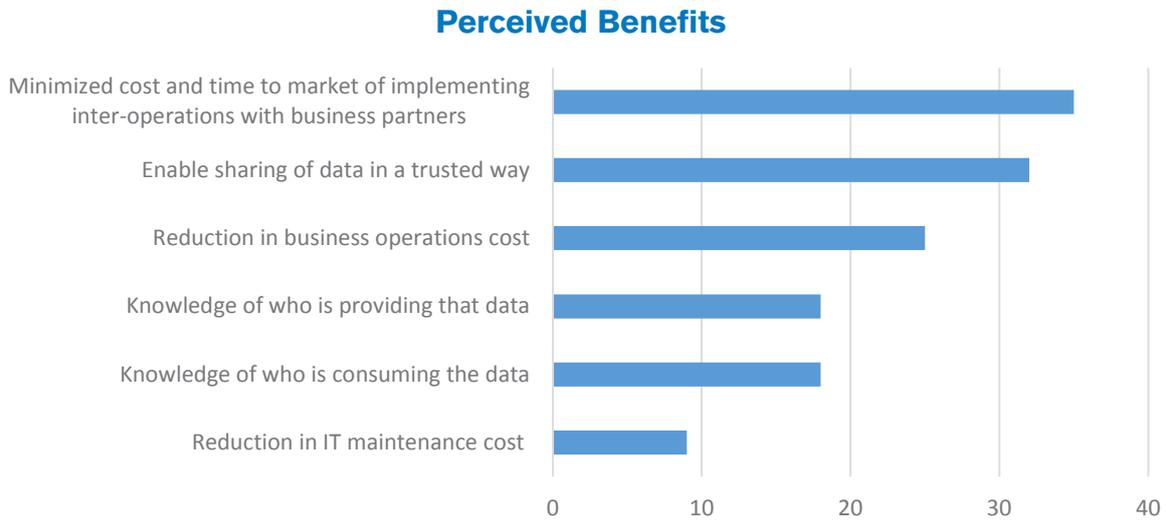
Perceived Benefits

Figure 7: Benefits realization of Open APIs.

4.5 What is Required from the Airline Industry Perspective ?

The two most important items required from the industry perspective are the standardization of the data formats for the data being published and the standardization of the data definitions. IATA already provides the Airline Industy Data Model (AIDM) for the data definition. This is further discussed in Section 5.5 '*The Role of IATA*'.

The industry directory service was the third most important requirement, and is discussed further in Section 5.7.
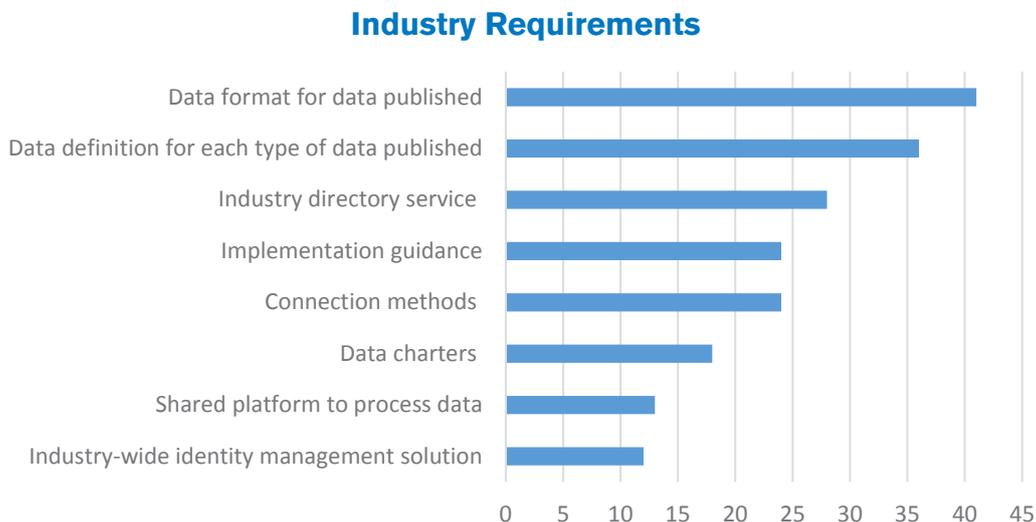
Industry Requirements

Figure 8: Industry requirements needed to promote Open APIs.

5.1 What are the benefits?

Looking at what has been realized in other industries and the type of applications that have been made possible by using Open APIs, a number of clear opportunities begin to emerge both in the B2B as well as the B2C environment.

Enable self-service
Self-service allows multiple and diverse organizations to use your data in a controlled and managed way. There can be some significant opportunities for innovation and interesting models. This is because, many more innovative entities will subscribe to your service than you may have thought possible.

Transport for London has had over 8,200 developers use their data from Open APIs and produced over 500 mobile apps. If one assumes an average cost of $30,000 per app, then the value of these developments alone is $30 million.
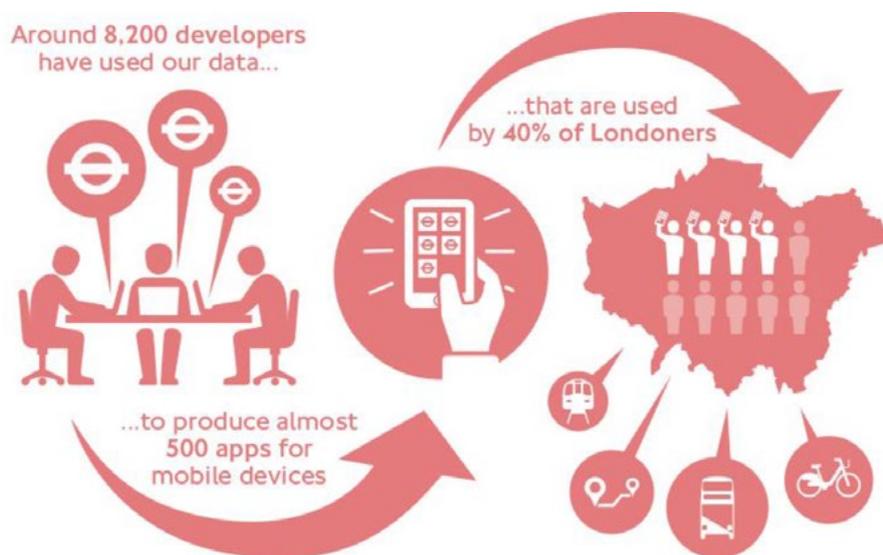

Figure 9: Transport for London (TfL) use case.

Encourage innovation "at the edge"
By allowing anyone to subscribe to the data, you are opening up to possibilities which you were not initially aware of.

Promote quality and timeliness of the data
Airlines exposing their data via an Open API platform can be confident that this data is of high quality and is the latest version of the data.

Trusted data
When users of data can subscribe to a trusted source of data, then they are able to trust that this data is both accurate and the latest version of the data. This overcomes the problem where users often go to alternative sources such as "screen-scrapes" to get data which may be incorrect.

Retain visibility and control
Once an airline creates an Open API platform, users can then subscribe. The airline has full visibility and control over who is using their data, when they are using it and what volume of data requests they are performing.

Metered
One key feature of modern API platforms is that the volume of data / calls to a consuming entity is recorded. Therefore, an airline will know the amount of data the entity is consuming and are able to take their own decisions on whether they wish to cap the volume, reduce the speed over a certain volume or use this volume as a basis for a revenue model according to their own commercial criteria.

Managed for performance
Modern API platforms are able to scale capacity to manage performance when experiencing heavy demand. This ensures the needs of the data consumers can be managed.

5.2 What makes a great API – Some Best Practices

The best practices referenced here are recommended by the I.T. industry and may well have relevance to individual airlines wishing to implement their own APIs. We may wish to consider these when developing the best practices for the aviation sector. In particular, more detail will be needed as well as referenced data points. The objective will be to ultimately have a dedicated and detailed set of industry specific best practices to support airlines to implement APIs in a standard way that can be used by any airline and their technology providers. For an industry-wide deployment of Open APIs, it is clear that more work will need to be done and more industry coordination will be needed to ensure that the users can treat the entire industry as one virtual storefront of an Open API. For consideration are the following key technology points:

Build for today while preparing for tomorrow
Today, new User Interfaces (UI) and additional product capabilities are requested while existing product features see repeated change, and product strategies shift at an unrelenting pace. Products should be a dynamic composition of services rather than an inflexible structure. A multi-tiered architecture allows the security to be embedded yet creates the speed of innovation at the consumption side of the platform. The layers can be categorized as follows:

- **System Layer:** System APIs provide a means of accessing underlying systems of record and exposing that data. These APIs will also change more infrequently and will be governed by Central I.T. given the importance of the underlying systems.

- **Process Layer:** The underlying business processes that interact and shape this data should be strictly encapsulated independent of the source systems from which that data originates, as well as the target channels through which that data is to be delivered. These APIs perform specific functions and provide access to non-central data and may be built by either Central I.T. or Line of Business I.T.

- **Experience Layer:** Data is now consumed across a broad set of channels, each of which want access to the same data but in a variety of different forms. Experience APIs are the means by which data can be reconfigured so that it is most easily consumed by its intended audience, all from a common data source, rather than setting up separate point-to-point integrations for each channel.

Each API-led connectivity layer provides context regarding function and ownership

Layer	Ownership	Frequency of Changes
System Layer	Central IT	6-12 months
Process Layer	Central IT and Line of Business IT	3-6 months
Experience Layer	Line of Business IT and Application Developers	4-8 weeks; more frequently for more mature compagnies

Figure 10: The API Layer Architecture and the frequency of changes.

Treat your API like a product

Today, a product's user interface is the main touchpoint, however, API interfaces are set to become the new normal. Rapidly piecing together components, via APIs, into a new product, or sub-product, requires each piece to be understood and validated through a feedback cycle. Investing in developer on-ramp-up and API user experience (APX is to API what UI is to UX) is therefore essential for product adoption. API storefronts should attract, and make adoption easy for developers. In using the term storefront in this context we mean the place where developers can go to access developer resources and not the tool to develop the storefront UX to the end customer.

Be agile in the right way

Agility to respond to customer feedback is key. Teams must quickly prototype beta releases, gather feedback, pivot and course correct without causing mayhem internally. Agile product organizations think in terms of building blocks with modules of sub-products and functionality that can be quickly composed, disassembled, changed, and recomposed. For this to be possible, APIs for all foundational, product and ecosystem services must be discoverable and well-documented.
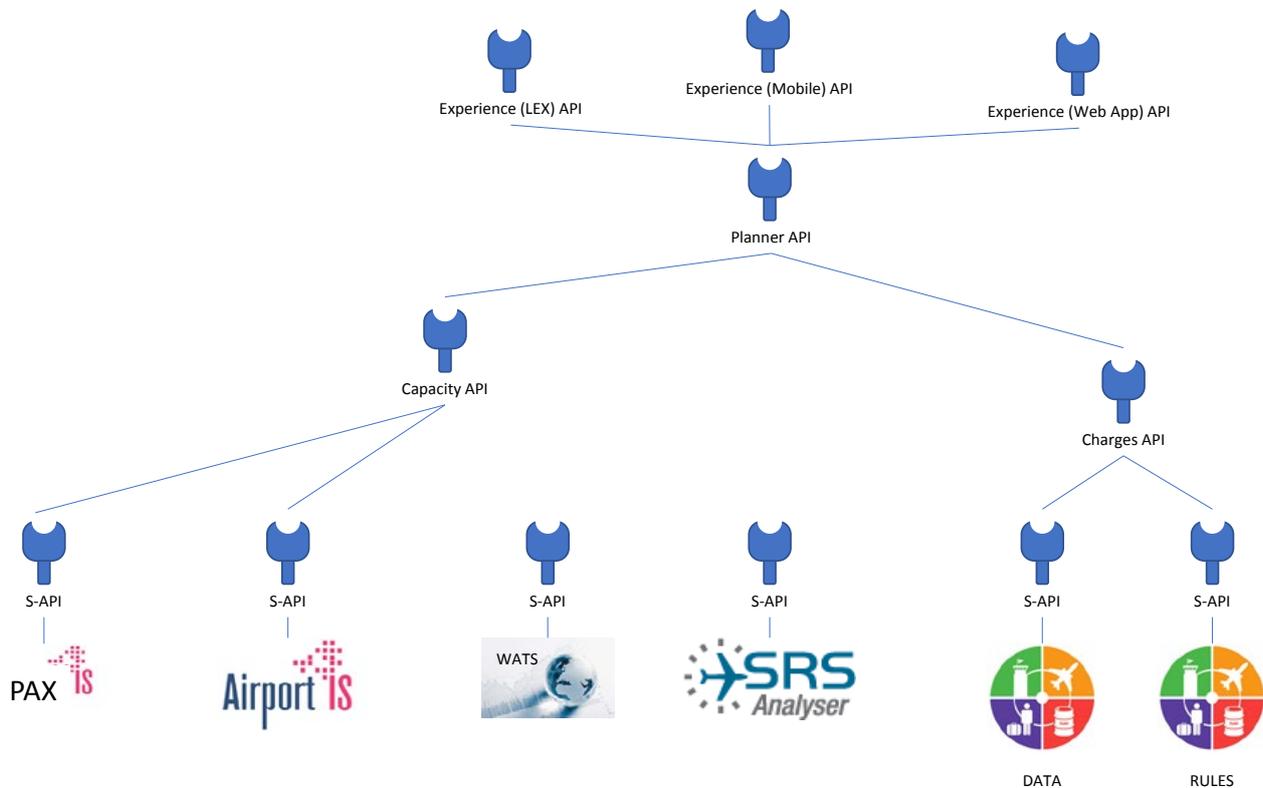

Figure 11: Example Landscape of System, Process and Experience APIs.

Have a connectivity strategy

An API-led connectivity approach has become the new standard. It enables strategic use and re-use of connectivity infrastructure. In contrast, when code is written to quickly "hard-wire" APIs to the back-end or to orchestrate multiple APIs, it generally cannot be adapted for use by multiple teams so additional connections are made and hidden dependencies develop which can threaten product quality, reliability and supportability.

The best way to combat the desire to "hard-wire" is to make it easier to connect to backend infrastructure, APIs and services the right way. Publish connectivity templates that can be easily discovered and leveraged during product development. Empower product teams to utilize existing API interfaces and proven architecture patterns. Don't waste time rebuilding the same connectivity components for every new product release.

Use tools fit for modern delivery

The healthiest product organizations incorporate development and operations (DevOps) best practices for lean requirements, continuous deployment, testing automation and application delivery. The ability to reduce mean time-to-production by removing latent hand-off and back-and-forth between developers and operators is key. In addition, the cultural aspects of collaboration, process and people management should not be overlooked as delivery is operationalized.

Collaborate to reduce technical debt

Encourage collaboration throughout the development lifecycle of every component of the API-led connectivity fabric - from API design to business logic orchestration, all the way down to the last database query. Enable product developers to experiment, mock, test and get feedback incrementally and regularly. Involving downstream users early drives product usability, and collaborating with other developers helps ensure best-practices are shared and adopted. Practicing collaboration at scale will go a long way towards building high quality, reliable, and well architected products.

Create product architecture transparency

Products powered by an API-connected fabric can have complex interdependencies across hundreds of moving parts. Architecture visibility is the key to understanding critical breakpoints within the product, and for planning management strategies such as how and when to apply rate limits in different areas of the architecture. Keep a pulse on individual APIs and microservices. Use predictive analytics and preventive maintenance to avoid disasters. If something does break, know how to quickly troubleshoot and respond to issues.

Provide defense in depth

In today's digital world, getting hacked is just a matter of time. Unfortunately, developers often don't prioritize and incorporate security best practices. Instead, downstream teams are called up on to address security after the product is fully developed, resulting in ineffective implementations. Ensure developers design security in from the beginning by providing them with security best practices in the form of architectural design patterns and runtime policies. Employ controlled governance at the edge, through internal micro-gateways and with global, federated policies.

"In our work with leading aviation companies, we're seeing airlines increasingly think of themselves as digital platforms that enable core capabilities (such as ticketing, flight tracking etc.) to be accessed through any channel, at any time. APIs are the foundational building blocks on which these digital platforms are built. Initiatives such as IATA's Open API will be critical in helping to set standards and accelerate adoption"

David Chao
Head of Industry Solutions,
MuleSoft

6.1 Select the Right Use Cases – A Proposal for an Industry Approach

As an industry, it is important that we approach the Open API initiative in a common way. The key to this common approach is that everyone can start at the same point and expose the same data sets first. This will provide the greatest benefit to the users. The building of APIs is represented below in phases. To arrive at these proposed phases, multiple factors have been taken into consideration in order to propose the best place to start.

We began by focusing on the customer. Firstly, the API must provide value to your customers. In the first instance, your customer is your passenger, therefore, how can exposing data directly or indirectly add value to the customers journey, whether is providing them, as example, real time travel information or easy access to the taxi services available. Our definition of customer in this context is anyone who may use this data. This could include but not be limited to:

- Airlines
- Airports
- Air Traffic Control
- Government and Border Entities
- Passengers and
- Other modes of transport operators (e.g. rail, buses, taxis)

The second factor considered is the strategic importance of this data for an airline to achieve their strategic goals. For example, does this positively influence the customer's experience, or does it better assist the management of irregular operations.

Finally we looked at how practical it would be to implement. If it were technically too difficult to expose the data, then there may well be little appetite for the business to expose these data sets. For example there could be legal issues about data privacy, as well as policy or business model issues.
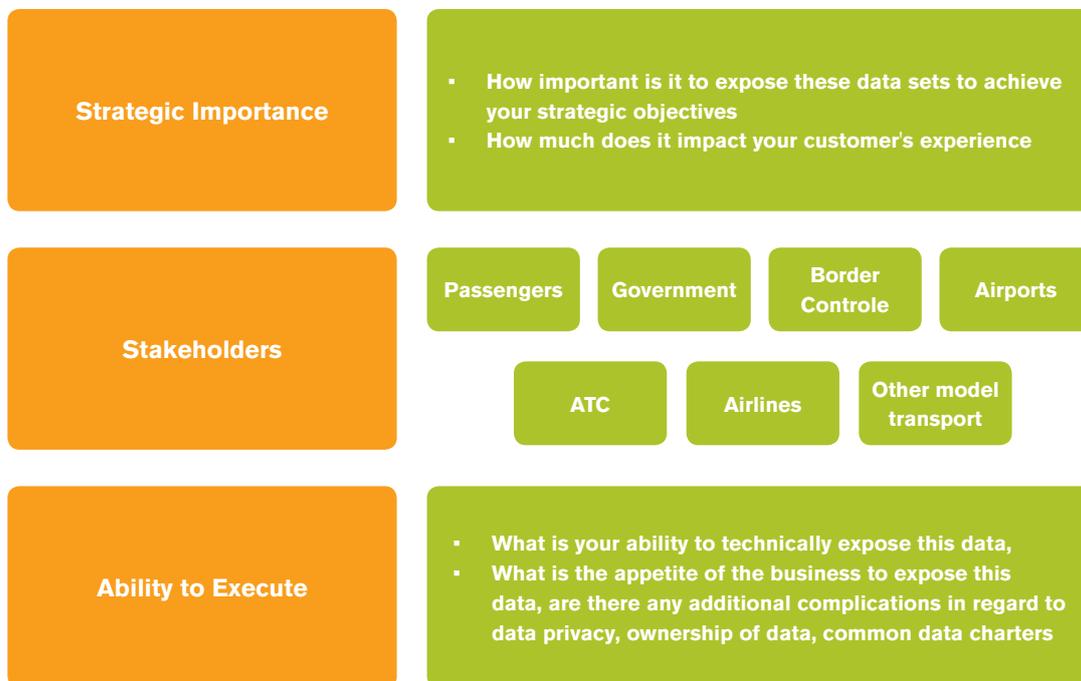
Strategic Importance	• How important is it to expose these data sets to achieve your strategic objectives • How much does it impact your customer's experience
Stakeholders	Passengers · Government · Border Controle · Airports · ATC · Airlines · Other model transport
Ability to Execute	• What is your ability to technically expose this data, • What is the appetite of the business to expose this data, are there any additional complications in regard to data privacy, ownership of data, common data charters

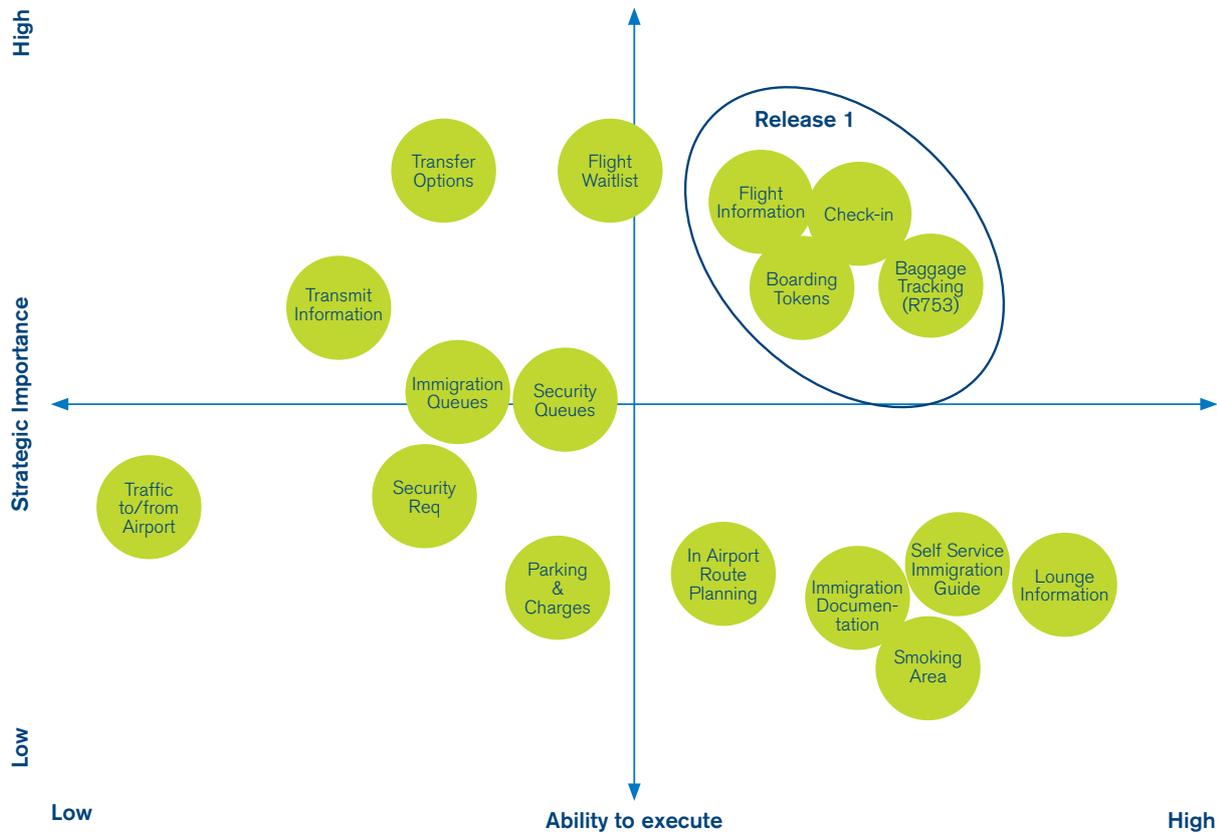*Figure 12: Summary of decision making proposal for the use case.*

Figure 13: Proposed initial focus for Open APIs as discussed with members of the Simplifying the Business Steering Group.

Based on our above analysis, using these criteria, a number of varied use cases were considered for a potential first phase proposal. Figure 13 shows the ease of the capability to execute against the potential strategic importance for an airline. As a result of this analysis, the data sets of release one of the Open API model (where there is a high probability to execute and a high probability that it is strategically important for carriers) should be Flight Information (Flight status, gate change and Departure time), Check in and, Boarding Information and Baggage Tracking (as a result of the forthcoming implementation of Resolution 753 – Baggage Tracking effective from 1 June 2018).

"Flight information is a key one to benefit from an API standard as it is probably the one with most of misinformation that our customers see in the various touchpoints by all stakeholders, especially when there are disruptions."

Rob Broere
Vice President PSS Transition
Emirates Airlines

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IATA has a number of roles to assist the industry in implementing Open APIs.

7.1   Education

IATA creates discussion papers, white papers, conducts seminars and events as well as has a presence at a number of external events throughout the year which creates opportunities to discuss the wider adoption and deployment of Open APIs.

7.2   Standards Setting, Best Practices, Implementation Guides and Tools

It is important that the business expertize drives the development of business standards. Once key use cases have been identified, the ownership, and most importantly the drive for the development and deployment of associated standards, transitions to the Passenger Services Conference standards groups with intimate knowledge of a given business area and the end users' needs. For example, the development of business requirements for Open APIs supporting boarding processes shown in the above section would be driven by the Passenger Experience Management Group which has ample experience with passenger facilitation, check-in and boarding processes.

This does not necessarily mean that standards work needs to start from scratch. Indeed, a number of existing industry standards easily lend themselves for implementation as Open APIs. Take the New Distribution Capability (NDC) program as an example. The goal of NDC is to facilitate distribution of airline offers to the market and indeed, several airlines today already distribute their offers via Open APIs based on the existing industry messaging standard and via any entity which agrees to the airline standard Open API contract.

7.3   Airline Industry Data Model (AIDM) – Interoperability and re-use

Seamless flow of data becomes challenging when the same term has different meaning in different systems or while multiple terms are used in different industry standards to describe the same concept.

The Airline Industry Data Model (AIDM), as the cornerstone of a new industry methodology for development of data exchange standards, is a single point of access to store:

- Industry-agreed vocabulary,
- Data definitions and their relationships,
- Message models, and
- Underlying business requirements.

"We need a standard way to expose our data so that everyone can get maximum value from this data"

Rosalie Hallenbeck
Director, Employee Customer Solutions
Alaska Airlines
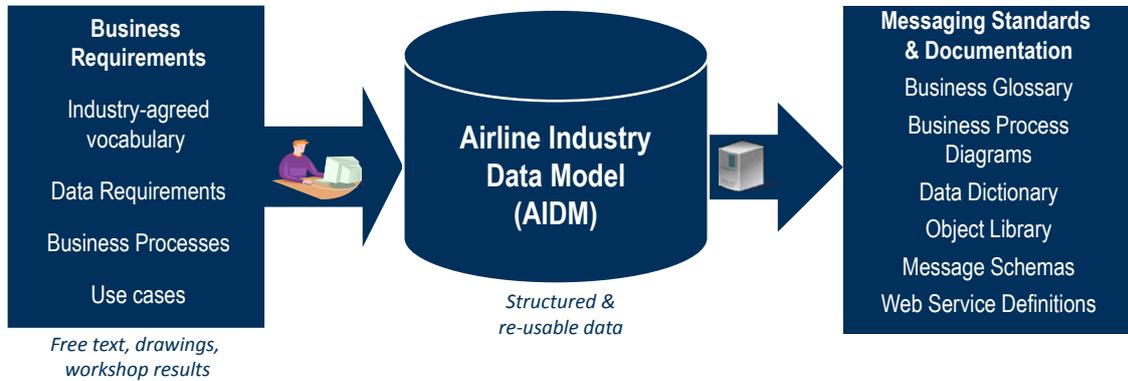
Airline Industry Data Model

Figure 14: Airline Industry Data Model Process.

As of October 2016, all new projects with a data exchange component and aiming to develop standards under the governance of the Passenger Services Conference, use the AIDM and associated methodology to document and model business requirements and generate resulting message specifications such as XML schemas. The platform specific layer of the AIDM can also be used to maintain models and generate specifications for other technologies such as JSON.

Using the common definitions from an integrated industry data model is the first step allowing the industry to expose its data in a consistent manner and create a virtual distributed Open API "store" that makes the industry data available in a controlled and coordinated manner to anyone who has the need and the right to receive the data.

7.4   Open API implementation guidance

As the industry clearly indicated in the survey, standard data definitions alone is not enough. More industry best practices may be needed to facilitate deployment. The Passenger and Airport Data Interchange Standard (PADIS) Board, which is

also responsible for the AIDM, is expected to provide architectural support and drive the development of associated best practices.

7.5   Standards Setting Workspace (SSW)

The standards setting governance under the Passenger Services Conference itself is currently undergoing a major transformation and is upgrading its capabilities to take into account the need to be more agile, bring standards to the industry much faster and create innovative ways to help set those standards.

In addition to the AIDM referenced above IATA is deploying an industry Standards Setting Workspace (SSW) to enable a much broader level of participation and to provide an online collaboration presence that will ensure complex topics can be discussed and documented more frequently than is possible with face-to face meetings.

7.6 Coordination of Industry Wide Deployment and Implementation Support

IATA has a long standing experience and know how supporting industry wide deployment of new initiatives. Deployment of industry wide Open APIs is likely to consist of multiple business driven projects, each of them requiring communications of benefits and building industry the awareness, coordination with other industry initiatives, project management, facilitation of an industry wide debate to establish industry priorities and dissemination of resulting standards, implementation guidance and sharing lessons learnt.

Some of the tools that IATA expects to deploy in support of the Open API initiative include the running of hackathons (see http://ndc.developer.iata.org/hackathon/) and operating a developer portal (developer.iata.org) to be launched during 2018. This site could also feature a directory listing that anyone can use as a reference point to find a comprehensive list of APIs base on industry standards.

7.7 Other considerations

Last but not least, IATA itself provides a number of core industry data services such as the assignment of industry codes and maintenance of many industry reference data sets. This technology creates an opportunity to also review how industry reference data is distributed today and what are the needs for their distribution going forward.
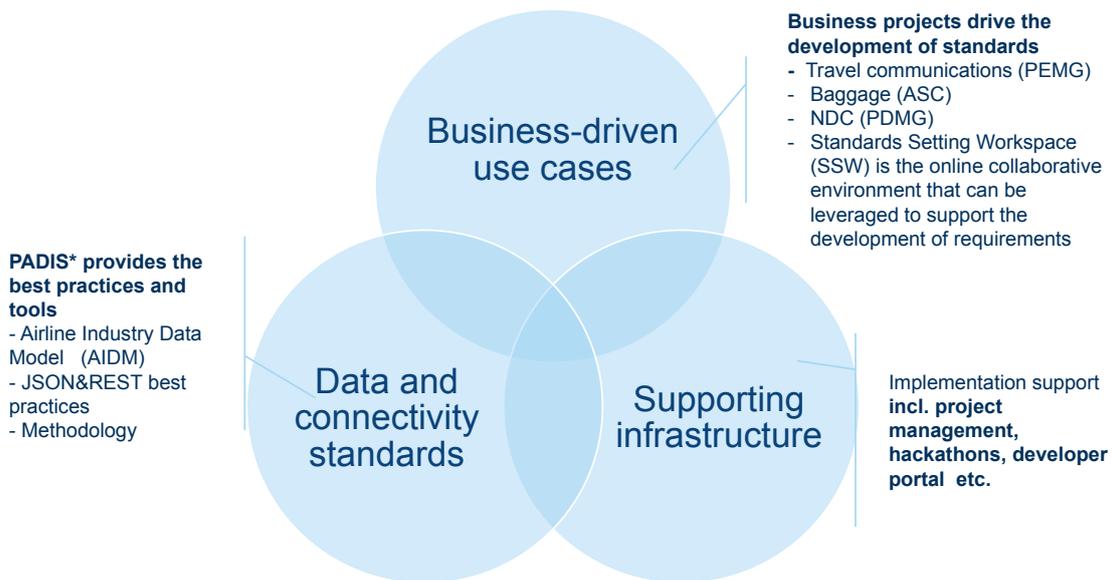
Open API Ecosystem Implementation & Adoption

Figure 15: How IATA can help the implementation and adoption.

7.8   IATA Reference data

IATA maintains, on behalf of the industry, a large amount of reference data. We are also recognized as the single source for providing a whole range of industry codes.

The type of reference data we manage includes:

- Airline 2 character designator codes,
- City, airport and surface transportation 3 letter location identifiers,
- Tax codes and their related application,
- Cargo and passenger agency codes,
- Airline accounting codes and prefixes,
- Baggage tag issuer codes,
- Multilateral and some bilateral interline agreements,
- Standard service references for reservations processes (special service requests),
- A variety of codesets to facilitate data exchange,
- Aircraft types,
- Terminal codes.

This reference data is available through our numerous products, services and publications which has gradually moved from paper based publications to electronic publications and solutions offering added features. Our first SMART service will be the development of the IATA Ticket Tax Box Service (TTBS) into a new online platform offering at least 10 new added value features that is currently not possible today.

The next stage of the development will be to assess how IATA can make its own reference data managed on behalf of the industry available through Open APIs. We will be assessing what will be the appropriate business model needed to deploy IATA's own Open APIs to expose this reference data during 2018.

We believe that it is important to promote all the available Open APIs across multiple locations, to ensure we have maximum level of exposure to drive the greatest level of innovation. Here is a list of web resources to help the broader implementation of Open APIs.

IATA's own developer portal
Focusing currently on the New Distribution Capability our plan is to extend the reach to become a repository of all key documents and programs which relate to Open API.
This site would also have a directory of all known Open APIs and the specific content they expose.
We plan to have this additional content live in 2018

The role of this site would be as a directory listing which anyone can use as a reference point to find a comprehensive list of relevant APIs based on industry standards.
NDC – The Next Disruptive Change

Programmable Web
Since it was founded in 2005, ProgrammableWeb has been chronicling the daily evolution of the global API economy while amassing The Web's most relied-on directory when it comes to discovering and searching for APIs to use in Web and mobile applications.

Once an airline has built an Open API, they should then add their API into the listing within programmableweb.com under the category "Air Travel"

SITA
SITA also has a list of APIs which are specifically targeted to the aviation sector. Once live, your Open API should also be listed here.

Promote via Hackathons
Hackathons are a great way to promote your APIs via a structured event. A hackathon is an event where teams compete to develop the best solution (app, website, etc) based on a predetermined problem. The organisers provide a pre-determined set of APIs to expose. By using these APIs, programmers can then resolve the pre-determined business problem.

IATA runs a series of aviation related Hackathons Information on the Hackathons is available on the NDC develop portal

"Hackathons are great for innovators to use and test APIs in new and innovative ways."

Ravindra Simhambhatla
Vice President,
Commercial Technology & Corporate Systems
United Airlines

Open APIs will grow in importance for the transportation sector in general and the aviation sector in particular and is set to become an integral way in which data between entities in a trusted, timely and yet open manner is shared.

The case for change is beyond doubt. Innovation with speed and agility to deploy quickly will be key. Our research and survey has demonstrated that the industry is preparing to launch into a major deployment of Open APIs.

The industry needs a coordinated approach and a collaborative environment to determine the most appropriate use cases to start this journey and develop the standards to support the broader and easier implementation of a wide and diverse Open API ecosystem which will benefit transportation providers enabling them to offer added value products and services.

IATA looks forward to supporting the industry on this journey!