

MANAGING USER DATA IN A DIGITAL WORLD

AIRLINE INDUSTRY CHALLENGES AND SOLUTIONS



Mindtree

Welcome to possible



WHITE PAPER

OVERVIEW AND DRIVERS

In today's digital economy, enterprises are exploring ways to differentiate themselves from their competition. For the airline industry, the focus is on a more personalized customer experience, which includes:

- Up-selling and cross-selling personalized customer services using real-time information and the status of travel plans. For example, offering valet parking tickets to travelers arriving late for a flight, accommodation services in case of a delays, and other services.
- Personalized shopping offers based on destination and travel information, including benefits like loyalty discounts, information on availability of merchandise suited to destination and travel purpose.
- Improving customer's travel experience by using integrated passenger information related to events, weather conditions, traffic, and seasonal trends over time.
- An experience of 'being with the customer continuously throughout their journey' by providing location-based

services, trusted travel advice, information exactly at the required time, and related services.

However, airlines face two key challenges in trying to differentiate themselves from competitors:

■ INEFFICIENCIES INHERENT IN THE EXISTING IT LANDSCAPE

The current state of airline IT systems evolved organically over time, with the common problems of data duplication, no clear system of record, service oriented principles being adopted in certain sections, and other issues.

■ THE PACE OF CHANGE IN TODAY'S DISRUPTIVE MARKETS NECESSITATES AN EXTREMELY QUICK TIME-TO-MARKET

Trying to meet business needs without aligning the implemented solution to a long-term architectural strategy can deliver features / capabilities quickly, but may not drive a faster time-to-market.

There are many inefficiencies in the existing airline IT landscape. This whitepaper focuses on challenges inherent in one of the cornerstones of providing a better customer experience-user data management.

CHALLENGES

Typical challenges in meeting the requirements for a better, more personalized customer experience include:

- **DATA:** The key to any airline personalization initiative is data. Unfortunately, the data in evolving airline systems has not been well-managed. In addition to the efficiency and time-to-market challenges mentioned above, there are often variations between the structure and definition of the same entity across multiple systems, apart from heterogeneous technology implementations. These issues increase the complexity of updating, transforming, or using the data in a meaningful manner.



User Data Challenges

- **SPEED OF CHANGE:** The pace of change in today's digital economy also causes the quantity and structure of user data to change at an unprecedented speed. This has inadvertently resulted in an overall degradation of data quality, usability, increased redundancy, and overall TCO
- **ACTIONABLE INSIGHT:** While most enterprises collect and have access to the needed elements of customer information, the ways and means to convert this 'raw data' to 'actionable insight' have not evolved at the same speed. The third key challenge in implementing a consistent user data management solution lies in devising a solution that can generate meaningful, actionable elements in a format that can be consumed by downstream applications and services

Any digital consolidation or eCommerce initiative, especially for airlines, requires a clear strategy to address, manage, and mitigate the risks to success. The complexity of these initiatives are order-of-magnitudes higher in scenarios where companies have been acquired or merged, and the technology systems and applications have not yet been consolidated.

The next section of the paper briefly examines the elements of an effective user data management strategy, and components that can help these initiatives succeed.

IMPLEMENTING A USER DATA MANAGEMENT STRATEGY

A well-defined user data integration strategy will provide a single, shared vision to enable:

- Sharing standardized, canonical information throughout the whole airline organization.
- A standardized, improved data model that can adapt to fit the needs of many business areas.
- Sharing consistent information with other external organizations.
- Consistent enterprise data standards.
- A blueprint for the development of an organizational information infrastructure that is interoperable, extendible, and scalable.
- Improved information performance through standards.
- Increased data trust across teams through governance mechanisms.

The next section details the key qualitative aspects and architectural elements that can contribute to an effective user data management strategy.

QUALITATIVE ASPECTS

- The selected strategy should start with long-term vision and objectives
- Once the long-term vision and objectives are established, the selected strategy should consider current enterprise-level strategic initiatives, with intermediate transition stages if necessary
- The selected approach will need to incorporate skill-set /capabilities build-up within the enterprise, and also include sufficient lead time, costs, etc. factored in.
- Since requirements are almost constantly changing, the selected approach should be highly flexible and extensible to evolve over time along with revised business capabilities

In our of experience working with Fortune 500 companies, we always ensure the proposed user data management solution addresses the four standard 'PReSS' attributes adequately:

- **PERFORMANCE:** Any Utility DataHub (UDH) - not sure if this is the right expansion integration strategy must satisfy the enterprise's standard non-functional and performance requirements, such as number of simultaneous users, volume of transactions, etc. The solution must scale comfortably over time to accommodate increases in volume
- **REDUNDANCY:** Given the data quality and redundancy challenges inherent in today's enterprises, the proposed solution should ensure managed user data follows a canonical model and is consistent, clear,

and accurate. ■ **SCALABILITY:** Apart from response times and bandwidth constraints, the selected strategy should also cater to increasing volume, and the revisions to the planned capacity based on peak times of use, customer interest, new integration points, new application systems, business growth, and other factors.

- **SECURITY:** Because the core of user data management works with personal customer information, the approach must be highly secure. Security should extend from the persistence layer to network, code, and application layers.

Ensuring that the above attributes are addressed sufficiently enables the proposed solution to be much more efficient, extensible, holistic, and aligned to the enterprise's longer term vision.

ARCHITECTURAL ELEMENTS

There are several technological challenges that also need to be addressed including heterogeneous technology stacks, lack of a canonical data model, structural and rules variations by region, and type of system. These issues should be considered apart from core data quality issues of duplication, consistency, etc.

In our experience, the best practices we follow when designing our proposed approach for user data management solves these challenges using three key elements:

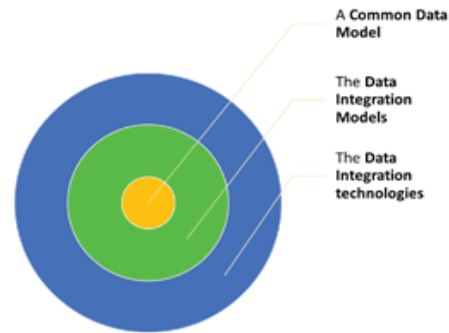
- The **Canonical Data Model (CDM)** includes the common representation, the meaning of and relationships between logical entities. This model can adapt to changes in the information's business context, and enables loose-coupling to achieve flexibility, independence, and modularity. The CDM describes what information to move between services, the structure of the elements, common rules, audit and tracking details, and/or transformation methods, and enables a loosely coupled, standards-based integration strategy.
- The **Data Integration Model** represents the approaches to implement the CDM. Based on context, these can be realized through a combination of data consolidation, data federation, data transformation, and data enrichment capabilities.
- Once the data model and integration strategy is defined, realizing them can be accomplished through **Data Integration Technologies**. This includes various off-the-shelf tools used to implement the data integration models. In our experience, a combination of tools are generally required to handle the diverse requirements. Usually, these tools can be classified into standard groups of Extract, Transform, and Load (ETL); Enterprise Information Integration (EII); Enterprise

Application Integration (EAI), Enterprise Data Replication (EDR), Enterprise Content Management (ECM), Master Data Management (MDM), and Customer Data Integration (CDI).

The next section examines the requirements for a clear, structured process with well-established guidelines to enable a smooth transition.

HOW DO WE GET THERE?

The path to the desired end-state must consider various social, resource, political, and alignment aspects within the organization to achieve the most efficient approach possible. Experienced data integrator services can assist based on best practices and experience in similar projects to ensure that risks are identified and addressed early in the project's lifecycle.



An ideal approach for data integration:

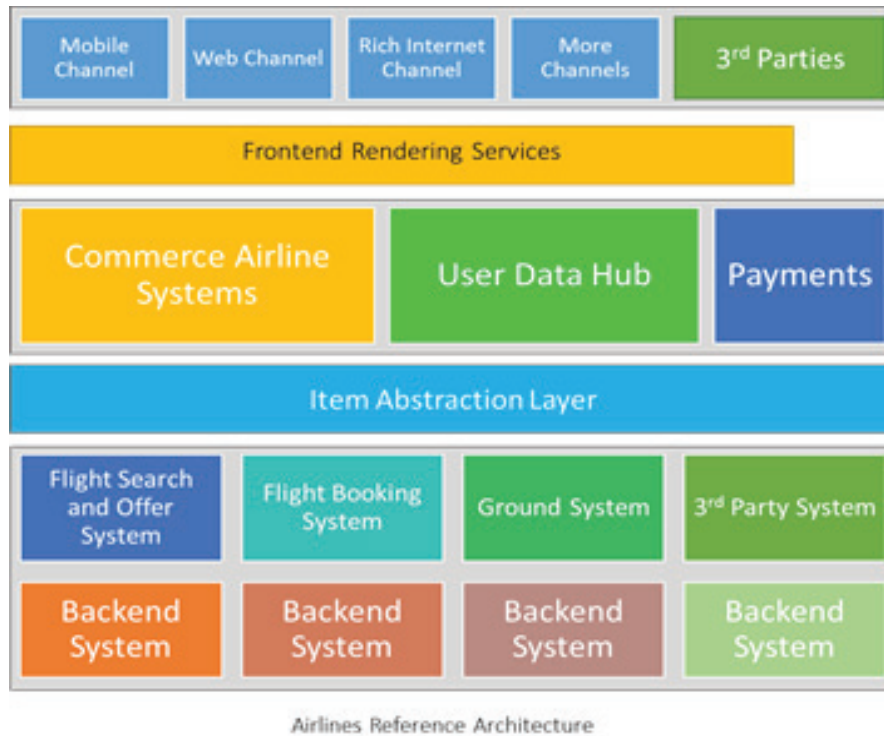
- Provides standards-based, well-defined blueprints, roadmaps, frameworks and deliverables to align multiple teams towards a single goal
- Implements systematic process management on data architecture across business and IT
- Implements a delivery strategy based on increments to enable continuous development
- Prioritizes high-risk areas for focus, design, and delivery
- Defines a delivery strategy that avoids serial bottlenecks
- Prioritizes the delivery of tactical projects in the context of long-term strategy
- Aligns user data management strategy with organizational culture and their ability to change
- Integrates a data management performance metrics strategy from the beginning to measure and analyze progress with a view towards continuous improvement
- Defines and implements solutions decoupled from vendor changes
- Factors in changes to business requirements over the planned duration of the program
- Adapts to progressive technology changes with vendor releases

SOLUTION

Our approach to building data integration strategies for our customers begins by breaking the problem into three broad areas:

1. **TECHNOLOGY SOLUTION:** Acknowledges industry standards, protocols, product capabilities, etc., and delivers a solution that integrates with the airline's existing and strategic landscape(s)
2. **DATA QUALITY:** Ensures duplication, consistency and cleansing are adequately addressed
3. **INTEGRATION STYLE:** Enables better scalability and availability of relevant information for consuming applications

The diagram below is the airline version of an ideal reference architecture from the Mindtree Central Architecture Group's repository. The diagram depicts the interplay between a User Data Management solution and a typical collection of airline systems.



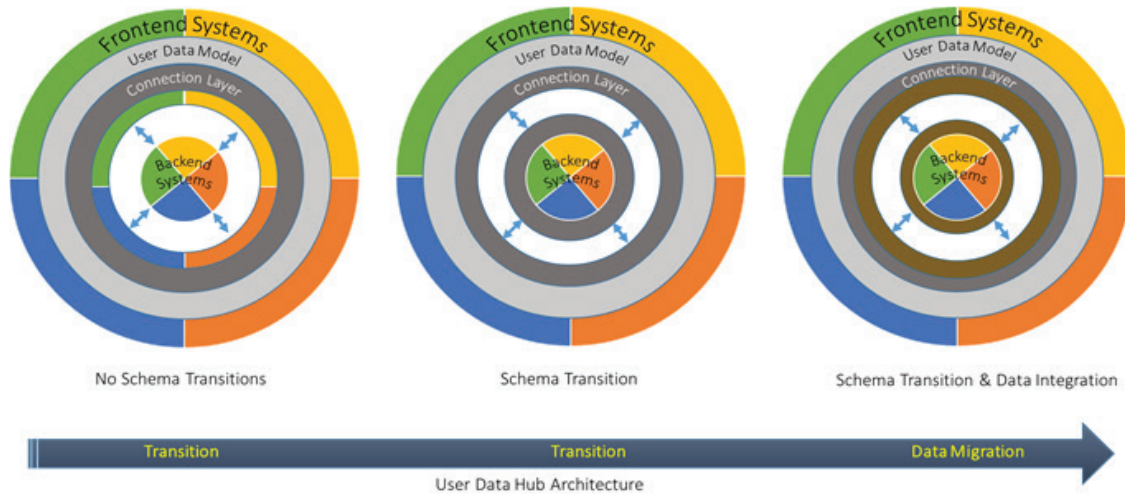
Apart from providing clear, consistent, canonical, and context-sensitive customer data to downstream applications, the user data management solution also plays a role in meeting privacy requirements by authenticating requests for information. As a result, the selected approach must also consider typical integration strategies with the existing authentication and loyalty applications apart from standardized protocols and formats.

Addressing customer data quality issues is critical to the success of overall digital initiatives. Even if the most

appropriate technology product is selected, data quality issues can severely undermine the overall success of the program. Here are key data quality aspects to consider:

- **DATA CONSOLIDATION:** Eliminates fragmentation and redundancies
- **DATA CLEANSING:** Resolves duplicates and corrects inaccuracies
- **DATA CONSISTENCY:** Enables accurate and comprehensive customer profiles and history.
- **DATA SYNCHRONISATION:** Supplies clean, complete data to all systems

Once the quality issues are addressed and product and technology options are chosen, the last critical component is mapping between the canonical model and the existing legacy systems responsible for providing the actual data. The diagram below compares the three common options:



The options above vary in two areas:

1. The role played by the 'adapters', which are responsible for translating airline-specific data structures to and from the canonical model
2. In the degree of responsibility given to data synchronization

As a general rule, we recommend limiting the degree to which the proposed solution relies on data synchronization. However, we are aware that there are a few scenarios where synchronization is not only the only choice, but the best option.

An added benefit of user data managers becoming 'owners' of customer records is the ability to provide seamless transition between strategic and legacy applications to enable a smooth, personalized customer experience.

PROCESS AND PRINCIPLES

Built on the technical solution and strategy, four key pillars are essential to the success of user data management initiatives:

1. **PEOPLE:** Includes key aspects like executive sponsorship from the onset, appropriate assignment of roles and responsibilities, clear data strategy defined by a data architect, resourcing and training to build a skill base that enables a culture of information excellence
2. **PROCESS:** A systematic approach for the overall program, defined and evangelized standards, policies, and procedures. Process should also include a well-defined blueprint that enables continuous communication and collaboration, and an architectural vision that aligns airline business objectives to technology

3. **ORGANIZATION:** Addresses typical organizational challenges like establishing an Information Architecture Group, selecting and transitioning to the most appropriate partner, and delivery models for information architecture, infrastructure, and other areas
4. **VISION:** The approach must ensure the strategic requirements from the program's vision for the desired end-state are adequately considered in the technology selection. The approach should also emphasize improved flexibility and re-use, and technologies based on open / common standards to enable better flexibility and extensibility in meeting the desired vision

OUR EXPERIENCE

With more than a decade of travel industry experience, Mindtree understands the challenges faced by the airline industry and the opportunities for growth. Mindtree partners with global travel and hospitality companies to deliver next-generation IT solutions. Our expertise in legacy, mainframe, web services-oriented architecture, advanced analytics, mobile and cloud technologies help manage complex and mission-critical processes.

Our experts deliver travel and hospital services:

- Airline Management including planning, marketing, sales and distribution, fulfillment, operations and cargo
- Car Rental Systems that integrate fleet management, revenue management, reservations, front office operations and customer information management
- Hospitality Industry IT Solutions for property management systems, hotel registration and reservation systems, booking portals, travel shopping engines and timeshare holiday systems
- Travel and Distribution Solutions for developing and selling travel packages using multiple digital platforms

ABOUT THE AUTHOR

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ABOUT MINDTREE

Mindtree [NSE: MINDTREE] delivers digital transformation and technology services from ideation to execution, enabling Global 2000 clients to outperform the competition. "Born digital," Mindtree takes an agile, collaborative approach to creating customized solutions across the digital value chain. At the same time, our deep expertise in infrastructure and applications management helps optimize your IT into a strategic asset. Whether you need to differentiate your company, reinvent business functions or accelerate revenue growth, we can get you there. Visit www.mindtree.com to learn more.