Chapter 17

Use of Big Data in Aviation: New Opportunities, Use Cases, and Solutions

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ABSTRACT

The expansion of data and its efficient handling is becoming a more popular tendency in recent times bringing new difficulties to learn new avenues. Data analytics can be done more proficiently with the availability of distributed architecture of not only SQL (NoSQL) databases. Technological advancements around us are changing very rapidly, and major shift is being carried out, a switch from relational to non-relational world. When moving from relational to non-relational models, database administrators face common problems due to the fact that NoSQL is a no-schema database. The purpose of conducting this research is to propose a mechanism by which the schema of a relational database management system and its data can be transformed into big data by following some standardize guidelines. This model can be quite useful for relational database administrators by enabling them to give attention to logical modeling rather than procedural writing for each and every SQL to NoSQL transition.

INTRODUCTION

Establishing communication with the aircraft is a priority task, which depends on the work of the administrative center (the so-called back-end airline) and the operation of departments directly related to customers (front-end). This includes improving the level of security, improving operational efficiency and, as a result, increasing revenue for the carrier. Already today, the analysis of the data is predicted to
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be the main factor that can change the organization of airline operations, and there are several reasons for this. Firstly, with the help of Big Data, ground preparations are faster due to a reduction in the processing cycle time (turnaround time). Secondly, data analysis offers the best solutions in the field of airspace management, which is the driving force for increasing efficiency. Thirdly, data analysis allows airlines to find an individual approach to each passenger. This is an opportunity for an organized re-registration of passengers during the cancellation of the flight and a direct way to increase customer loyalty to the brand.

In the air transport industry, huge amounts of data are circulated daily - from flights, tariffs and transactions to information about existing and potential customers. They change so quickly that it is impossible to process them in the traditional way. For these purposes, airlines around the world resort to the so-called Big Data technologies. They allow you to do something that a person can not do. Computer algorithms are quickly sorted out with a huge amount of chaotic data. Their analysis allows you to optimize the company’s business processes. In particular, Big Data technologies help to integrate the internal systems of the air carrier with the airport system, get real-time weather information, predict future aircraft failures. In addition, “large data” provides information on each client, which allows the airline to find an individual approach to the passenger, as well as conduct targeted marketing campaigns that increase customer loyalty to the brand.

Air carriers use Big Data technologies for different purposes. For example, the low-cost Ryanair applies them for targeted advertising. Airlines such as KLM or SWISS use “large data” to improve the quality of customer service. British Airways collects information about passengers using its own application, which uses to personalize the service. This works as follows: if the client reported his allergy, flight attendants will take this fact into account on all the following flights. If the passenger has raised his level in the loyalty program, it will also be known about this, for example, a glass of champagne can be offered to him. And if the client flies for the first time in business class, the aircraft personnel will receive the relevant information and will do everything to ensure that the passenger wants to repeat this experience. American airline Delta has created for its customers an application that allows you to track luggage. And Turkish Airlines with the help of Big Data will help passengers navigate the new Istanbul airport, which will open in 2018. In addition, if the passenger parked his car in the parking lot before departure, the special application of the airline remembers the location.

CIVIL AIRCRAFT BIG DATA PLATFORM

Large plane platforms are shown in Figure 1. During the flight, the flight data will move according to civil air craft in real time transferring large data platforms to the Civil Aircraft platform or through an open-ended data link. Statistics include aircraft position data and aircraft health monitoring data. After logging in, data from all parameter data will be sent offline. In real-time flight data is analyzed by Data Center and the plane’s health decision’s resultssent back. The database sends data recovery data and recovery recommendations to the airport maintenance center, which results in the maintenance of data center. To provide the aircraft’s real-time tracing the aircraft flight data and the airport’s operational data is used by data centerand provide advice for flight settings.

Real-time aircraft monitoring using the Big Data platform - SAP Predictive Maintenance. Maintenance is the repair, inspection or modification of an aircraft or its component. Aircraft maintenance is regulated to ensure safe and correct flight operation of the aircraft. National regulations are coordinated
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