High-Level Design (HLD)

Airport Data Analysis

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Document Version Control

Date Issued	Version	Description	Author
[illegible]	1.0	First Version of Complete HLD	

Abstract

Many airports have defined and implemented highly efficient and effective processes to perform aircraft, passenger, baggage and cargo operations. Having reached high standards of airport operations, the room for improvement diminishes, while the effort to identify, define and test novel processes is increasing exponentially. Traditional methods that rely on empirical knowledge, observation, and scenario testing are not expected to produce, anymore, the operational benefits that they have managed to attain in the past. Furthermore, there is a need for evidence-based substantiation of empirical airport operational knowledge in an effort to quantify and measure the operational benefits that have been attained and explore whether there is any opportunity to further augment those processes.

Airport data analytics for San Francisco help to unleash key information and knowledge that will help to address many of the key areas where airports face challenges. These areas extend to almost every facet of airport processes, from purely operational ones – such as airport resource usage optimization, maintenance, and airport capacity – to non–aeronautical revenue intensification and passenger experience maximization

1 Introduction

1.1 Why this High-Level Design Document?

The purpose of this High-Level Design (HLD) Document is to add the necessary detail to the current project description to represent a suitable model for coding. This document is also intended to help detect contradictions prior to coding and can be used as a reference manualfor how the modules interact at a high level.

The HLD will:

- Present all of the design aspects and define them in detail
- Describe the user interface is implemented
- Describe the hardware and software interfaces
- Describe the performance requirements
- Include design features and the architecture of the project:

1.2 Scope

The HLD documentation presents the structure of the system, such as the database architecture, application architecture (layers), application flow (Navigation), and technology architecture. The HLD uses non-technical to mildly-technical terms which should be understandable to the administrators of the system.

2 General Description

2.1 Product Perspective & Problem Statement

Airport data analytics are considered the enabler to unleash key information and knowledge thatwill help to address many of the key areas where airports face challenges. These areasextend toalmost every facet of airport processes, from purely operational ones – such as airport resource usage optimization, maintenance, and airport capacity – to non–aeronautical revenue intensification and passenger experience maximization.

Nowadays, aviation data derive from diverse sources and usually lacks the standardization, uniformity, and fault controls required for reliable integration in a common analytics platform. A mere examination of the relative literature shows an evolving domain that takes data collection and mining very seriously but faces a real obstacle when it attempts to scale up and combine data sources. In order to cope with this challenge, many participants in the aviation

industry have implemented their own isolated solutions, which may improve particular processes but failto capture the whole picture.

The objective of this project is to perform data visualization techniques to understand the insight of the data. This project aims to apply various Business Intelligence tools such as Power BI to get a visual understanding of the data.

2.2 Tools used

Business Intelligence tools and libraries work such as Excel, and Power BI is used to build thewhole framework.

3 Design Details

3.1 Functional Architecture

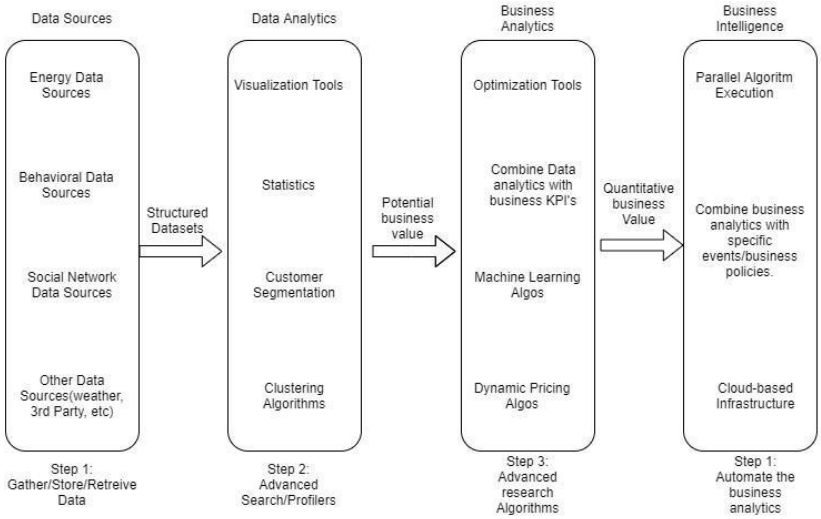
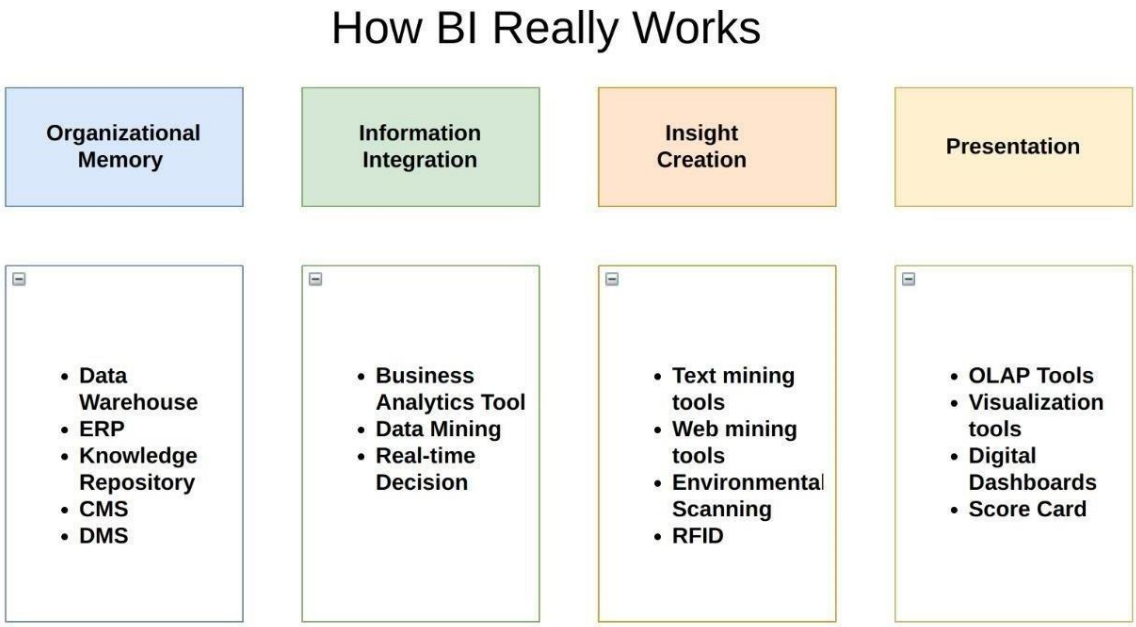


Figure 1: Functional Architecture of Business Intelligence



3.2 Optimization

Your data strategy drives performance

- Minimize the number of fields
- Minimize the number of records
- Optimize extracts to speed up future queries by materializing calculations, removing columns, use of new queries and measures

Reduce the marks (data points) in your view

- Practice guided analytics. There's no need to fit everything you plan to show in a singleview. Compile related views and connect them with action filters to travel from overviewto highly-granular views at the speed of thought.

- **Reduce the granularity of LOD or table calculations in the view. The more granularthe calculation, the longer it takes.**
- **Where possible, use MIN or MAX instead of AVG. AVG requires more processing than MIN or MAX. Often rows will be duplicated and display the same result with MIN,MAX, or AVG.**
- **Make a power query to perform operating with the report to get the desired result.Including Measures helped to get all the relevant visualization and Insights that reduces the load on the platform.**

4 KPIs

Dashboards will be implemented to display and indicate certain KPIs and relevant indicatorsfor the disease.

Power BI

As and when the system starts to capture any data for a user, the dashboards will be includedto display charts over time with progress on various indicators or factors

4.1 KPIs (Key Performance Indicators)

Key indicators display a summary of the Airport Data Analysis that helps to identify theoutcomes that are used on daily basis by the Aviation Industry.

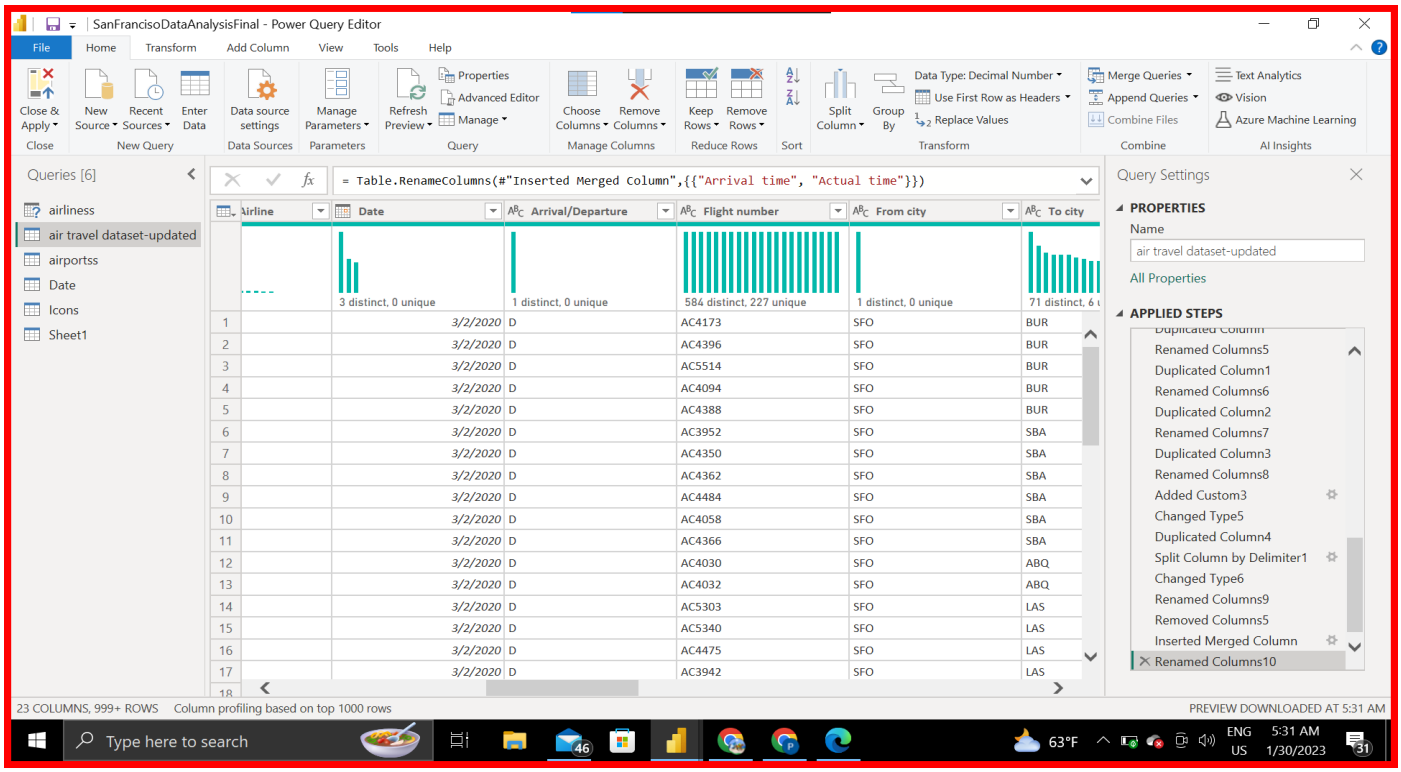
1. **Calculate the distance between the airport.**
2. **The maximum number of flights for specific locations.**
3. **Count of flights landed in which location.**
4. **Busy Route (Base Airline) that was used frequently by various flights.**
5. **Lengthy Route covered for which locations.**
6. **Check the count of flight status (on-time, re-schedule, delay).**
7. **Busy terminal used by the Airport Authority of San Francisco.**
8. **Busy day/week of the month**
9. **Arrival and Departure status board tables displayed.**

Create a table showing Arrival Status and Departure status boards.

5 Deployment

Prioritizing data and analytics couldn't come at a better time. Your company, no matter what size, is already collecting data and most likely analyzing just a portion of it to solve business problems, gain competitive advantages, and drive enterprise transformation. With the explosive growth of enterprise data, database technologies, and the high demand for analytical skills, today's most effective organizations have shifted their focus to enabling self-service by deploying and operating Power BI at scale, as well as organizing, orchestrating, and unifying disparate sources of data for business users and experts alike to author and consume content.

Power BI prioritizes choice in flexibility to fit, rather than dictate, your enterprise architecture. Power BI Desktop and Power Bi Online leverage existing technology investments and integrate them into infrastructure to provide a self-service, modern analytics platform for users.



- It's the *free* version which has **data analysis** and **reports creation capabilities**. Putsinfrastructure in same place as data (for migration to cloud).
- It has a drag-and-drop feature that makes creation of visualisation really easy.
- With Query Editor, you can use it to *connect* to lots of data sources and transform thedata into a model.
- Also, you primarily *don't* need the internet for the desktop version to work. You wouldonly need to hop online for publishing the reports to the online version.
- Features unique to Power BI Desktop include:
  - Data transformation, modelling, and shaping
  - Calculated columns
  - Python and DAX
  - RLS creation
  - In Power BI Desktop **modifying data is difficult**. In order to go back to the spreadsheet, make the changes, and reconnect the data is a lot of steps to do everytime for a small task.
  - To **specify the relationship** between different values is easy
  - The *existing* relationships of data are visible at a glance with Power BI Desktop's **model view**.
  - Power BI Desktop doesn't have a **dashboard feature**.