

High Level Design (HLD)

Airbnb Data Analysis

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Contents

Document Version Control.....	2
Abstract	3
1 Introduction	5
1.1 Why this High-Level Design Document?	5
1.2 Scope	5
2 General Description	6
2.1 Product Perspective & Problem Statement	6
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2.2 Tools used	6
3 Design Details.....	7
3.1 Functional Architecture	7
3.2 Optimization	8
4 KPIs.....	9
4.1 KPIs (Key Performance Indicators)	9
5 Deployment.....	9

Abstract

Airbnb, is an American company that operates an online marketplace for lodging, primarily homestays for vacation rentals, and tourism activities. Based in San Francisco, California, the platform is accessible via website and mobile app. Airbnb does not own any of the listed properties; instead, it profits by receiving commission from each booking. The company was founded in 2008 by Brian Chesky, Nathan Blecharczyk, and Joe Gebbia. Airbnb is a shortened version of its original name, AirBedandBreakfast.com.

This dataset describes the listing activity and metrics in San Diego, California for 2019. We will be finding out more about hosts, geographical availability, necessary metrics to make predictions and draw conclusions.

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 manual for 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 being implemented
- Describe the hardware and software interfaces
- Describe the performance requirements
- Include design features and the architecture of the project
- List and describe the non-functional attributes like:
 - Security
 - Reliability
 - Maintainability
 - Portability
 - Reusability
 - Application compatibility
 - Resource utilization
 - Serviceability

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

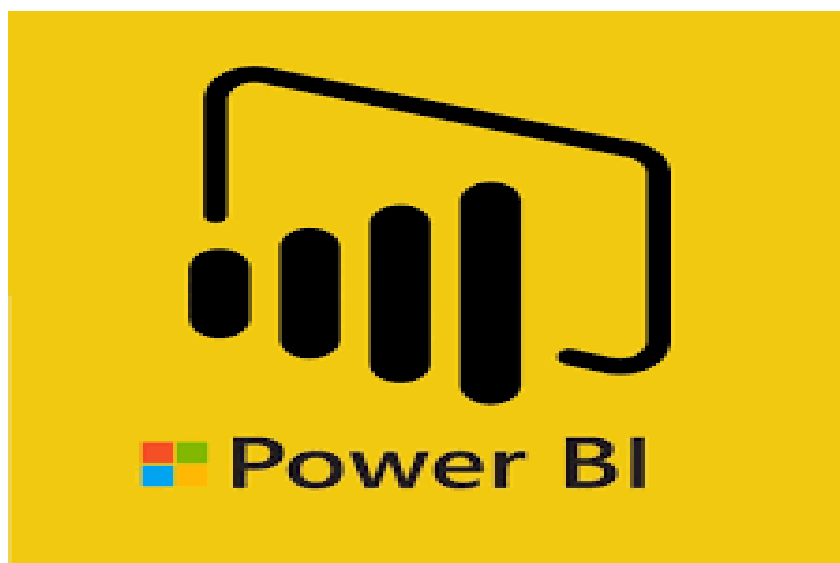
2.1 Product Perspective & Problem Statement

Since 2008, guests and hosts have used AirBNB to expand on travelling possibilities and present more unique, personalized way of experiencing the world. In this project we will be finding out more about hosts, geographical availability, necessary metrics to make predictions and draw conclusions.

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

2.2 Tools used

Business Intelligence tools and libraries works such as Excel, Power BI are used to build the whole framework.



3 Design Details

3.1 Functional Architecture

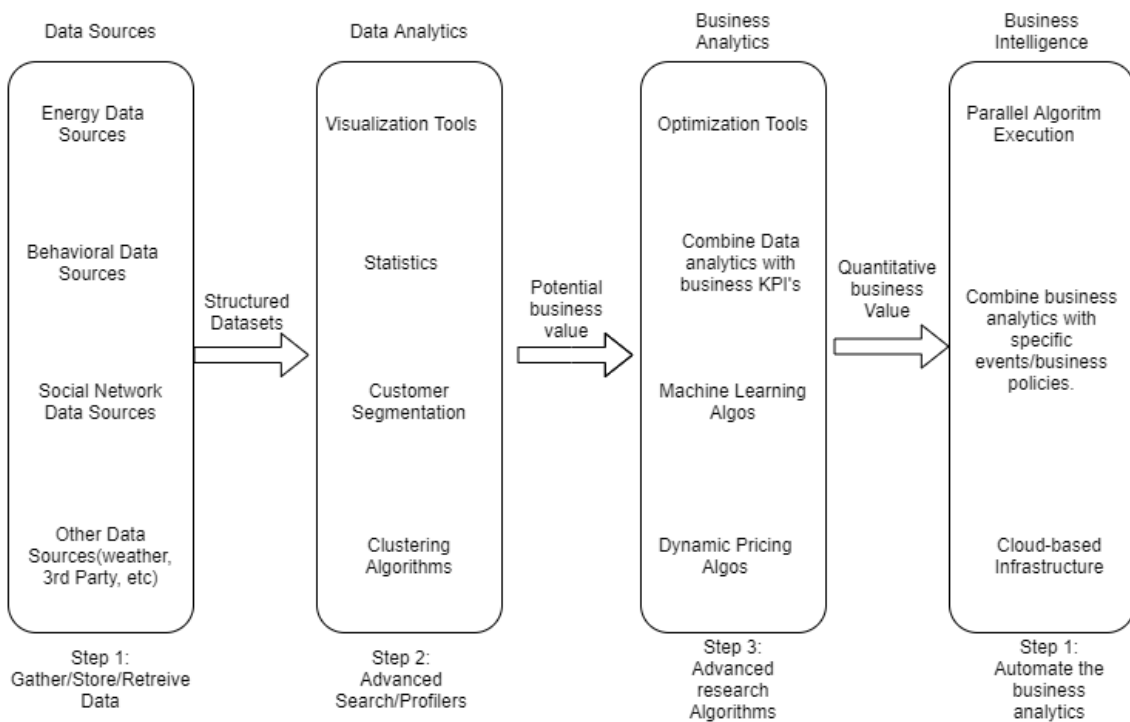
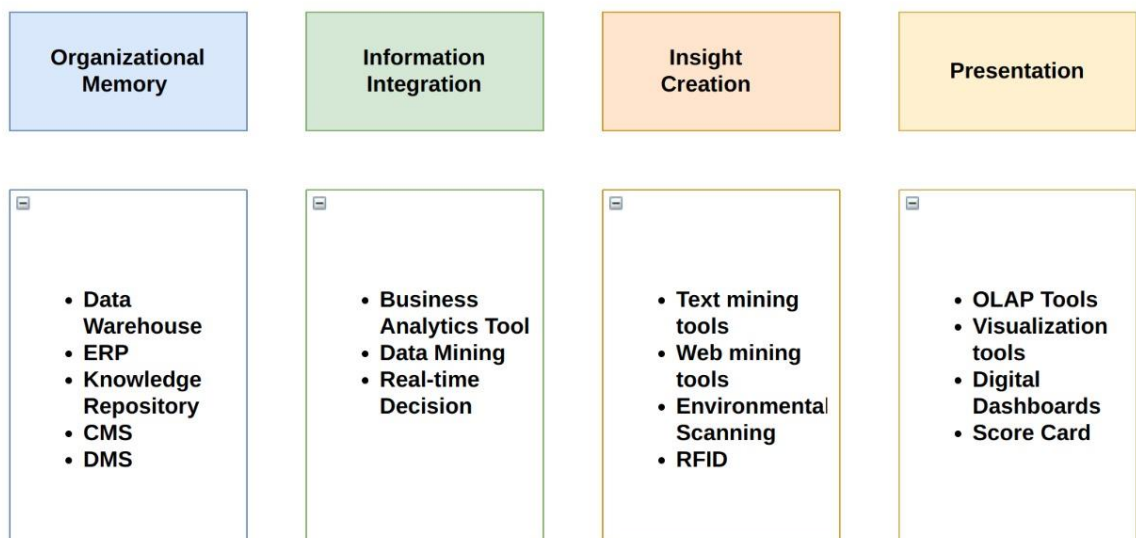


Figure 1: Functional Architecture of Business Intelligence

How BI Really Works



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 and the use of accelerated views

Reduce the marks (data points) in your view

- Practice guided analytics. There's no need to fit everything you plan to show in a single view. Compile related views and connect them with action filters to travel from overview to highly-granular views at the speed of thought.
- Remove unneeded dimensions from the detail shelf.
- Explore. Try displaying your data in different types of views.

Limit your filters by number and type

- Reduce the number of filters in use. Excessive filters on a view will create a more complex query, which takes longer to return results. Double-check your filters and remove any that aren't necessary.
- Use an include filter. Exclude filters load the entire domain of a dimension, while include filters do not. An include filter runs much faster than an exclude filter, especially for dimensions with many members.
- Use a continuous date filter. Continuous date filters (relative and range-of-date filters) can take advantage of the indexing properties in your database and are faster than discrete date filters.
- Use Boolean or numeric filters. Computers process integers and Booleans (t/f) much faster than strings.
- Use parameters and action filters. These reduce the query load (and work across data sources).

Optimize and materialize your calculations

- Perform calculations in the database
- Reduce the number of nested calculations.
- Reduce the granularity of LOD or table calculations in the view. The more granular the calculation, the longer it takes.
 - LODs - Look at the number of unique dimension members in the calculation.
 - Table Calculations - the more marks in the view, the longer it will take to calculate.
- 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 groups with calculations.
- Use Booleans or numeric calculations instead of string calculations. Computers can process integers and Booleans (t/f) much faster than strings.
Boolean>Int>Float>Date>DateTime>String

4 KPIs

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

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



4.1 KPIs (Key Performance Indicators)

Key indicators displaying a summary of the Airbnb Data and its relationship with different metrics.

(Room_ID, Host_ID, Room type, Neighborhood, Overall_satisfaction, city, Reviews, Accommodate, Bedrooms, Price, Name, Last modified, Latitude, Longitude, Location)

Objectives:

1. Top earners
2. Relationship between monthly earning and prices
3. Location getting maximum number of bookings in Neighborhood
4. Price relation with respect to location
5. Relationship between Quality and Price
6. Price vs amenities
7. Price vs location
8. Reviews

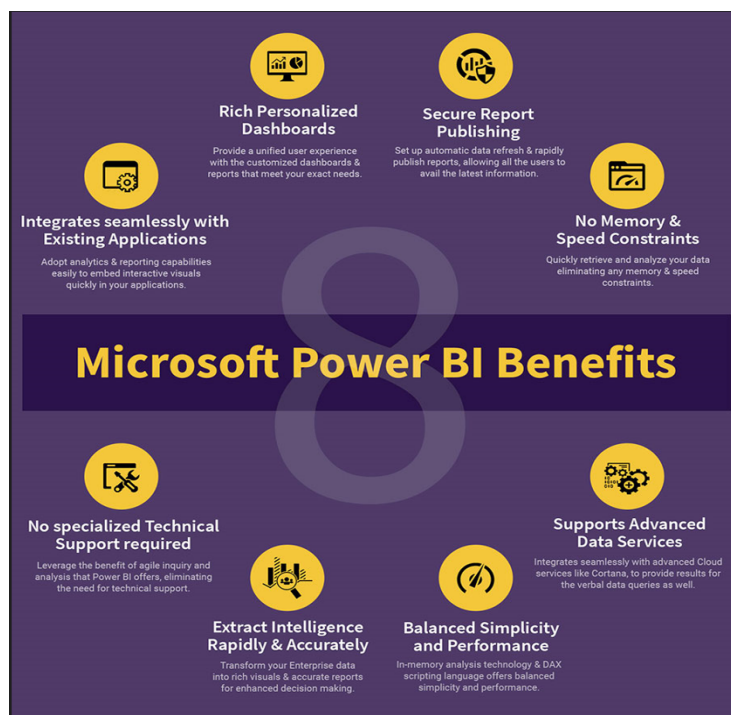
5 Deployment

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 IT organizations have shifted their focus to enabling self-service by deploying and operating Lower 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.

Lower BI is a cloud-based tool that requires no capital expenditure or infrastructure support regardless of the size of a business. The modern iteration of the tool is free from legacy software constraints and its users do not need any specialized training in order to generate business intelligence insights. Typical of all Microsoft cloud services, implementation of Lower BI embedded is rapid and trouble-free.

Here are few valued competences of Microsoft Lower BI toolK

- NIntegrates seamlessly with existing applications.
- NRich personalized dashboards.
- NPublish reports securely.
- NNo memory and speed constraints.
- NNo specialized technical support required.
- NExtracting business intelligence rapidly and accurately.
- NBalanced simplicity and performance.
- NSupports Advanced Data services.



The ever-growing set of tools that Lower BI contain holds the potential to provide with real, compelling and actionable insights from data, via dashboard-style reports. Lower BI has various benefits that can help you and your organisations improve on your business intelligence. With this, you now have a clear picture of various working ways of Lower BI, which will help you execute the same.

Components of Power BI

