High Level Design(HLD)
E-Commerce Dashboard

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PREPARED FOR:

iNeuron

PREPARED BY:

Aarsh Sapra

Rachit Agarwal

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17/08/2021	1.0	First Version of Complete HLD	1)Aarsh Sapra 2)Rachit Agarwal

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Abstract:

E-commerce (electronics commerce) is the buying and selling of goods and services or transmission of funds or data over an electronic medium. These transactions are either business-to-business (B2B), business-to-consumer(B2C) or consumer-to-consumer.

E-commerce dashboards are widely used by various companies to analyze their sales of different product categories and consumer patterns/demands.

The given dataset provides information about the sales of different product categories and enlightens us about the shipping modes, order priorities and most profitable regions/products.

Precise analysis of such data is an intimidating task as the company is not just concerned about their sales or profit. There are numerous other factors that are of equal importance to an online e-commerce company providing utility goods to people over the internet.

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1. Introduction

1.1 What is a High-Level Design Document?

The purpose of this High-Level Design 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 contradiction 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

E-commerce dashboard is a curated set of metrics, KPIs(Key Performance Indicator(s)) and various other data fields that it is designed to highlight. It displays various trends, anomalies and information related to an online store/website that regularly warrants attention.Through this dashboard the company gets a summary of their business statistics like orders, revenue, net profit, shipping costs, average order size etc.

The objective of this project is to perform data visualization on the given dataset to understand the insight of the data. The project aims to use Business Intelligence tools such as Microsoft Excel and Tableau Public to get a visual understanding of the data.

2.2 Tools Used:

Business Intelligence tools such as Tableau Public and Spreadsheet software such as Microsoft Excel have been used.

Tableau Public has been used as the principal software for data visualization and dashboard creation while Microsoft Excel has been used to gain understanding of the dataset and make minor changes

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3. Design Details

3.1 Functional Architecture

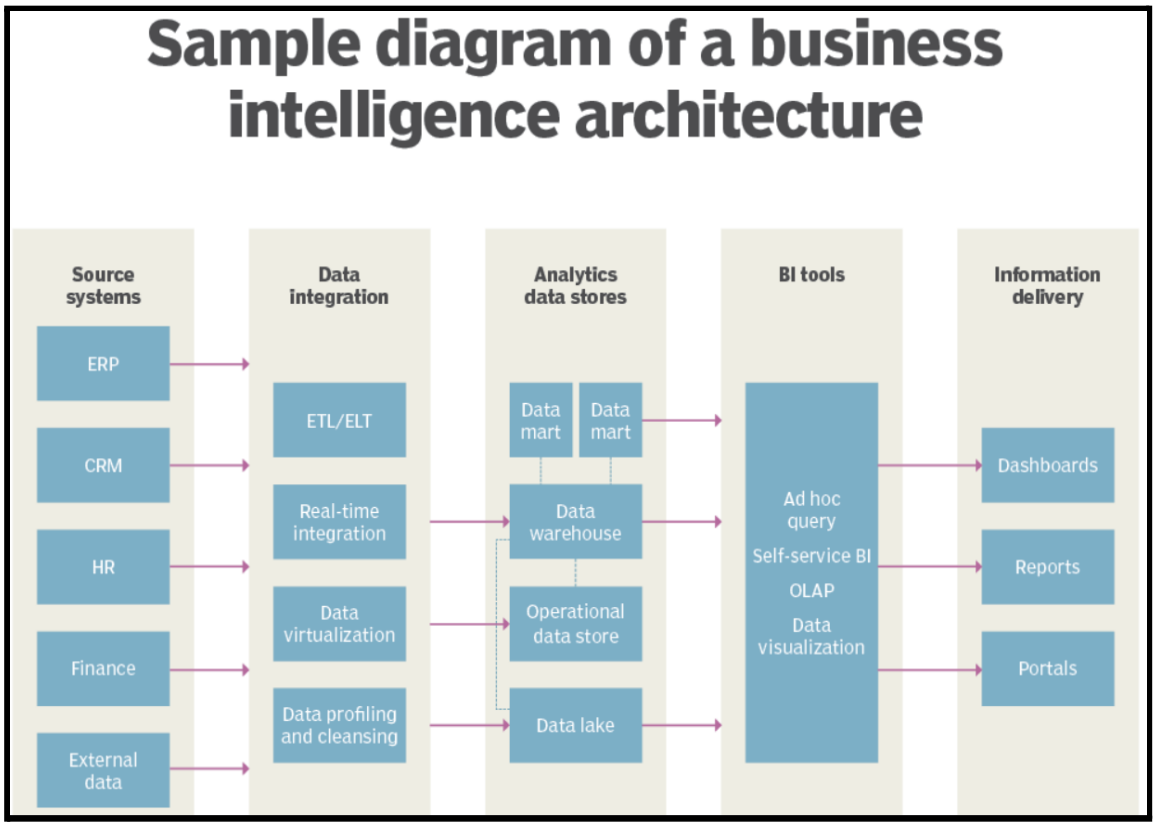
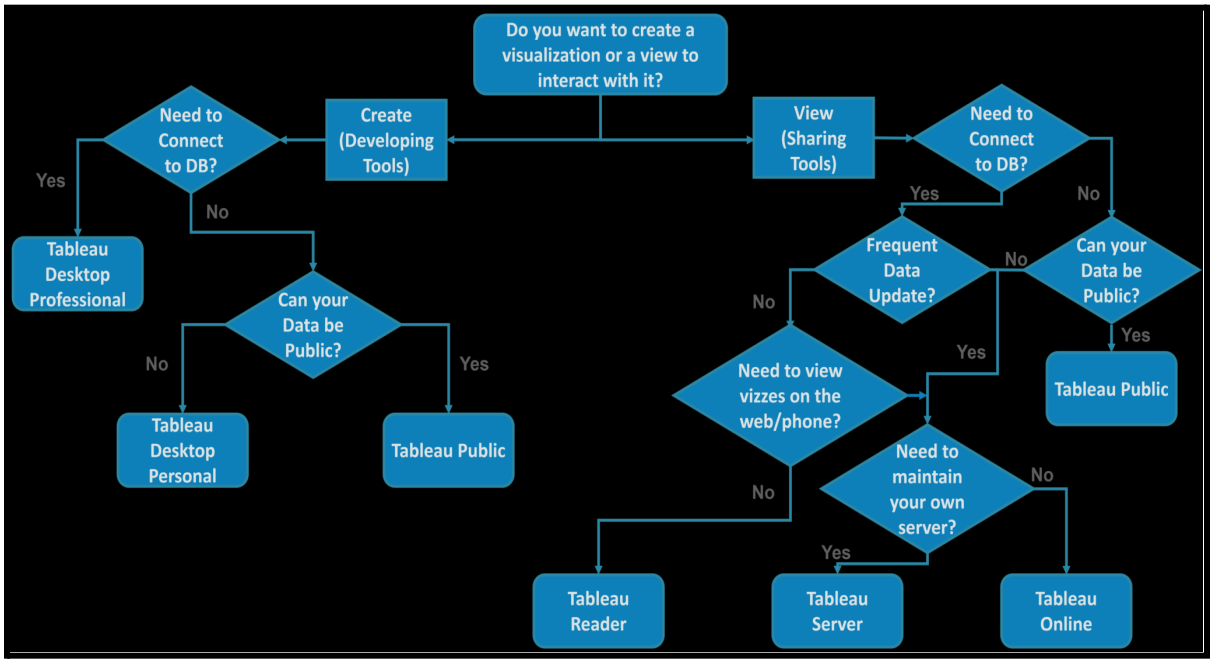


Figure 1: Functional Architecture of Business Intelligence

3.2 Working of Tableau



The Tableau Public is essentially a free version of Tableau visualization software. It allows you to use most of the software functions. You can create visualizations and connect to CSV, Text and Excel documents. However, the largest difference is that Tableau Public does not allow you to save your workbooks locally.

4.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 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).

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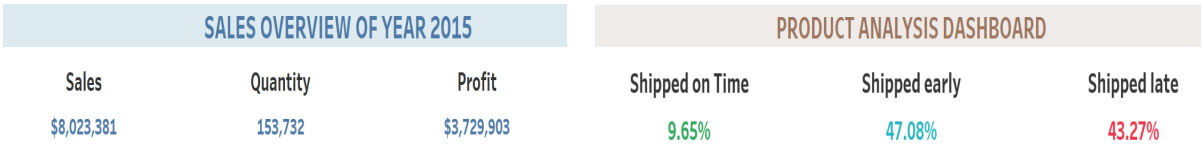
Optimize and materialize your calculations

- 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.
    1. LODs - Look at the number of unique dimension members in the calculation.
    2. Table Calculations - the more marks in the view, the longer it will take to calculate.
- Use MIN,MAX,SUM or AVG depend on the type of data and the use case. Do not choose a measure randomly.
- Make groups with calculations. Like include filters, calculated groups load only named members of the domain, whereas Tableau's group function loads the entire domain.
- 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

5. KPIs(Key Performance Indicators)

5.1) What are KPIs



A dashboard is implemented to visualize and display data for certain key performance indicators.

They display a measurable value through which we can understand how efficiently a company is performing in specific fields/areas.

The above figures display certain examples of KPIs in a dashboard.

5.2) KPIs in Project

1. Sales analysis based on regions,segments & product categories
2. Study of profit percentage of various product categories
3. Discovering top 10 most profitable products
4. Country & state wise profit analysis
5. Quarterly quantity of products
6. Product analysis based on shipping modes & order priority
7. Top 10 most discounted products

6. Deployment

Visualizing data on its own is not enough. Once the dashboard is created, it needs to be made accessible such that all concerned professionals can use it to study key factors and make certain improvements or changes. IT companies have shifted their focus towards deployment of such dashboards based on various business intelligence tools and Tableau is no exception.

Tableau prioritizes choice in flexibility to fit, rather than dictate, your enterprise architecture. Tableau Server and Tableau Online leverage your existing technology investments and integrate into your IT infrastructure to provide a self-service, modern analytics platform for your users. With on-premises, cloud, and hosted options, there is a version of Tableau to match your requirements. Below is a comparison of the three types:

TYPES PROS CONS

Tableau Server - On Premises

- Full control of hardware and software
- Infrastructure and data remain behind your firewall
- Need dedicated administrators to manage hardware and software
- Additional infrastructure needed to access off-network (mobile, external)

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Tableau Server - Public Cloud (IaaS)

- Full control of software on managed hardware
- Puts infrastructure in same place as data (for migration to cloud)
- Flexibility to spin up/down hardware as needed
- Need dedicated administrators to manage software
- Additional infrastructure needed to access off-network (mobile, external)

Tableau Online (SaaS)

- Fully hosted solution (hardware, software upgrades)
- Fast to deploy
- Easy for external audience to access
- Single-site in multi-tenant environment
- Cubes are not supported
- No guest account access

Any of these methods can be used by the company depending on their resources and use.

For the deployment of this project, Tableau Online (Public) method has been used as it allows users to deploy or host their dashboards without any memory usage restrictions and recognizes the author of the dashboard while providing all the functionalities required.