

High Level Design (HLD)

Amazon Sales Trend

Using Power BI

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Abstract

Amazon Sales data refers to sales, high performing sellers and several other data points. There are millions of Amazon sellers around the world. Amazon sales data Analysis focuses on the process of analyzing consumer behavior, sales, and several other attributes in order to make improved, data-driven decisions. It is key to successfully sustaining their businesses and earning profits and for this purpose, they analyze different metrics like sales, Sales Quantity, Discount rate, Sales over years etc. By analyzing different metrics, you will be able to increase and improve your performance in terms of sales, Items to be sold and discount rates etc. Analysis of the sales data the main factor that contributes to sellers improving their business and increasing their revenue. They can better understand the market trends and customers' buying behaviors and help them cater to what the customers really want. In the world of rising new technology and innovation, E-commerce industry is advancing with the role of Data Analytics. Data analysis can help them to understand their business in a quiet different manner and helps to improve the quality of the service by identifying the weak areas of the business. This study demonstrates the how different analysis help to make better business decisions and help analyze customer trends and satisfaction, which can lead to new and better products and services. Different analysis performed to get the key insights from this data based on which business decisions will be taken

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

Sales management has gained importance to meet increasing competition and the need for improved methods of distribution to reduce cost and to increase profits. Sales management today is the most important function in a commercial and business enterprise.

Do ETL : Extract-Transform-Load some Amazon dataset and find for me Sales-trend -> month wise , year wise , yearly_month wise

Find key metrics and factors and show the meaningful relationships between attributes.

2.2 Tools used

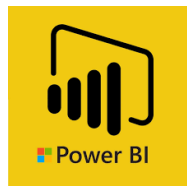
Business Intelligence tools and libraries works such as Excel, Power BI are used to build the whole framework.



NumPy



pandas



3 Design Details

3.1 Functional Architecture

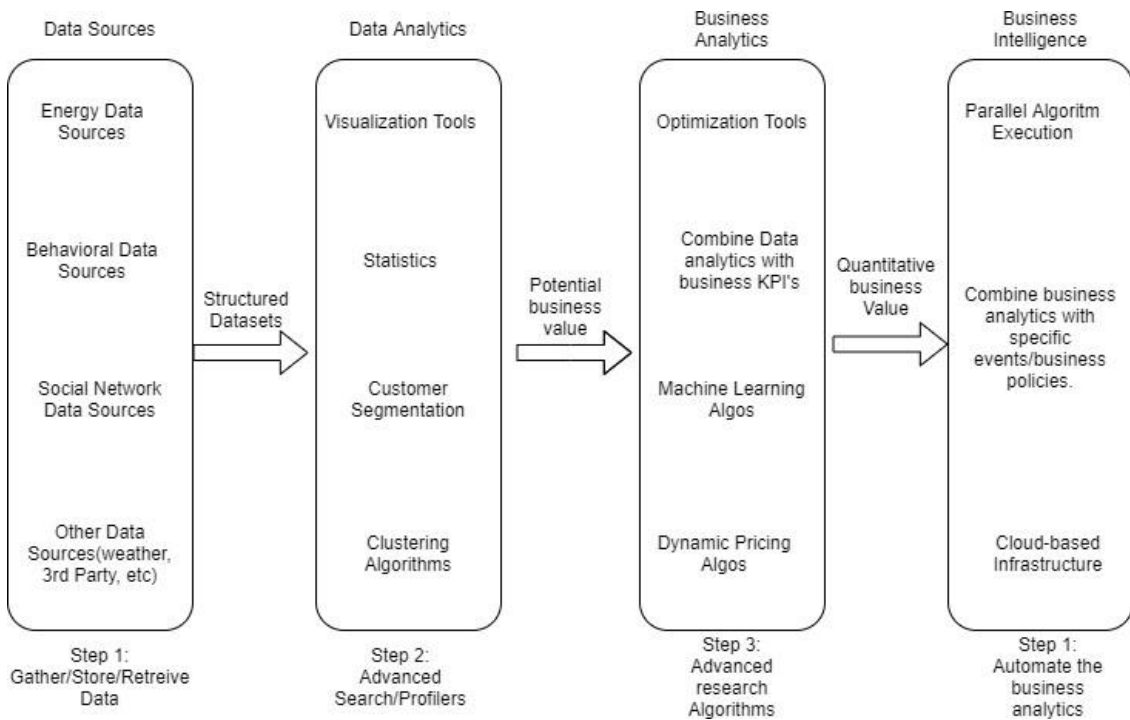


Figure 1: Functional Architecture of Business Intelligence

How BI Really Works



3.2 Optimization

Optimize and materialize your calculations

1. Use STAR Schema

Power BI is built to perform most efficiently when using a **STAR schema**. By breaking out your data model into fact and dimension tables, your queries will be optimized in your report. These fact and dimension tables should be related to one another, not joined (aka flat file format), which will result in more performant reports.

2. Limit Data Model

The fastest way to optimize your **Power BI report** is to limit the number of columns to only the ones you need in your data model. Go through your tables in **Power Query** and determine what fields are being used. Delete these columns if they are not being used in any of your reports or calculations. Another way to limit your data model is to use Row Level Security when applicable.

3. Push Data Transformations Upstream

Building on the previous step, if you are able to move your data manipulations to your query, this will help your performance. Whether you're doing calculations, formatting, or grouping at the appropriate granularity in your SQL, this will eliminate **Power BI** spinning its wheels on these items. If you end up doing your transformations in Power Query, try **Query Folding**.

4. Move Row Level Logic to Power Query

Move any logic that needs to be calculated at the row level to Power Query. Instead of using DAX to create calculated columns containing the more basic IF THEN calculations, use M to do the same thing. These fields will be included in your permanent data model brought in from Power Query instead of them being performed in Power BI Desktop

5. Use Measures Instead of Calculated Columns

For beginning Power BI users, it can be tempting to create calculated columns instead of using measures as you're able to see the row by row output for each calculated column. The issue is that calculated columns can be more burdensome for the data model as they actually create a new column of data. Instead, measures are simply aggregations of the fields in the data model, so they do not actually add new data to your model. Using measures where applicable will help reduce data model size as well as increase computation efficiency.

6. Convert Multiple Measures to Variables

Instead of creating metrics that require using [multiple measures](#), use variables. You can perform multiple calculations within a single measure using the VAR and RETURN functions. This will minimize the number of measures you use as well as increase performance for the metrics being calculated. If you are going to be repeating a variable multiple times then you can still create an independent measure for that value. See example of variables below.

7. Amend Dates and Column Types

Although this is probably the least impactful of the ideas in the list, editing your data's formatting can also help limit model size and performance. As an example, date will show as mm/dd/yyyy 12:00:00am by default in Power BI. To cut down on characters in the data model, [change the date](#) types to Date to eliminate the Time portion. If you have integers with a large amount of decimal points, reduce the decimal places showing. Lastly, if you have text showing TRUE or FALSE, you can change these to be binary, so 1 and 0.

Report View

1. Minimize Visuals

When creating your report, try and use as few visual elements in your report as possible. This will decrease the amount of calculations that Power BI is performing when rendering your report. An example of this would be using a multi-row card when showing multiple KPIs instead of using multiple single metric cards.

2. Don't Use Slicers (if possible)

Use slicers only where needed. Otherwise, use the filters available to users in the Filter Pane. Slicers are less efficient at returning required data than the Filter Pane. If you do use a slicer, make it a single drop down instead of a list. A list will pre-populate some queries in it and make it less efficient.

3. Use Performance Analyzer to Analyze

Power BI has a built in way for you to analyze the performance of your reports. In the View ribbon you can find the Performance Analyzer. By opening this pane and clicking Record, this will show you how fast your report renders when performing different functions in your report. You can also see what specific sections of your report are causing performance delays so that you can work on improving those sections.

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 Amazon sales Trend and its relationship with different metrics

1. Impact of discount on sales
2. Impact of sales by sales representative
3. Impact of sales by months
4. Impact of sales after margin
5. Top sales Representative of the week,month,year
6. Top Sold Product with Item Numbers
7. Total sales by year, Months,

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 Tableau 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. 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 Power BI to match your requirements. Below is a comparison of the three types:

TYPE PROS CONS

Power BI 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)

Power BI 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)

Power BI 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

Depending on your organizational roles and responsibilities, Power BI Server should be installed by a systems administrator and the designated Power BI Server Administrator in coordination with the appropriate IT roles. For Power BI Online, you will integrate with your existing technology and configure the site settings. The Data & Analytics Survey, completed by business teams, identifies and prioritizes data use cases, audience size, and users. You will use the information collected in both surveys to plan your deployment strategy, including sizing, installation, and configuration of your Tableau Server or integration and configuration of Power BI Online. In addition to installing Tableau Server or configuring Power BI Online, administrators will also need to plan for the client software installation of Power BI Prep Builder, Power BI Desktop, Power BI Mobile, and Power BI Bridge for Power BI Online where applicable.