High Level Design (HLD)

Consumer Goods Ad-Hoc Project

By

Pranit Patil

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Abstract

Atliq Hardwares (imaginary company) is one of the leading computer hardware producers in India and well expanded in other countries too.

However, the management noticed that they do not get enough insights to make quick and smart data-informed decisions. They want to expand their data analytics team by adding several junior data analysts. Tony Sharma, their data analytics director wanted to hire someone who is good at both tech and soft skills. Hence, he decided to conduct a SQL challenge which will help him understand both the skills.

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 helpdetect contradictions prior to coding and can be used as a reference manual for how the modules interact at a high level.

The HLD will:

A. Present all the design aspects and define them in detail.
B. Describe the user interface being implemented.
C. Describe the hardware and software interfaces.
D. Describe the performance requirements.
E. Include design features and the architecture of the project.
F. 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 HLDuses non-technical to mildly technical terms which should be understandable to the administrators of the system.

2 General Description

2.1 Problem Statement and Task

Atliq Hardwares (imaginary company) is one of the leading computer hardware producers in India and well expanded in other countries too.

However, the management noticed that they do not get enough insights to make quick and smart data-informed decisions. They want to expand their data analytics team by adding several junior data analysts. Tony Sharma, their data analytics director wanted to hire someone who is good at both tech and soft skills. Hence, he decided to conduct a SQL challenge which will help him understand both the skills.

Task:

Imagine yourself as the applicant for this role and perform the following task:

1. Check 'ad-hoc-requests.pdf' - there are 10 ad hoc requests for which the business needs insights.
2. You need to run a SQL query to answer these requests.
3. The target audience of this dashboard is top-level management - hence you need to create a presentation to show the insights.

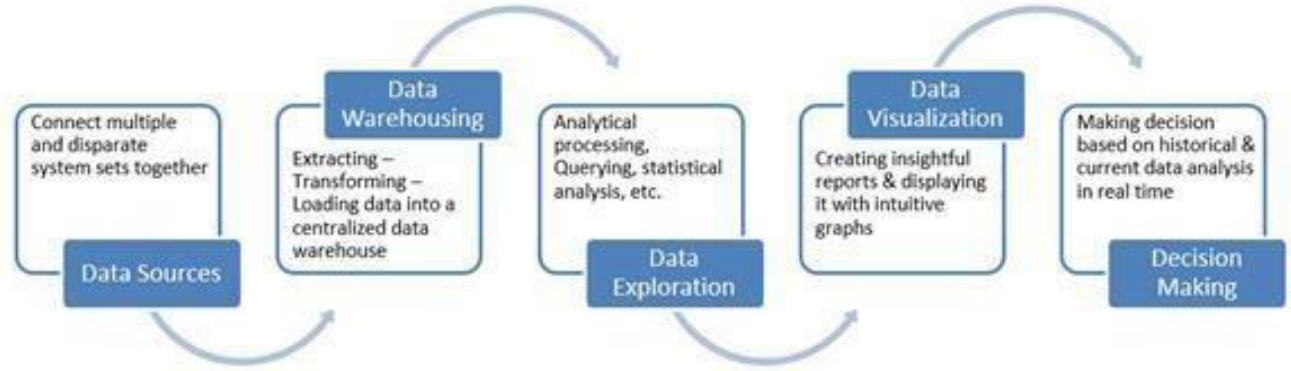
2.2 Tools used

Microsoft Excel, MySQL Workbench, Microsoft Power BI, Microsoft PowerPoint are used to build the whole framework.

3 Design Details

3.1 Functional Architecture

How Business Intelligence Work:



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. Like include filters, calculated groups load only named members of the 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).

4 KPIs

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

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 Consumer Goods Ad-Hoc Project and its relationship with different metrics:

1. Market Distribution of Atliq Exclusive in the APAC Region.
2. Percentage increase in Unique Products (2020 VS 2021).
3. Segment Wise Product Count.
4. Product Count 2020 & 2021 by Segment & Difference by Segment.
5. Highest and Lowest Costing Products.
6. Top 5 Customers with High Average Discount.
7. Monthly Gross Sales Amount for Fiscal Year 2020 and 2021.
8. Total Sold Quantity Per Quarter of 2020.
9. Gross Sales and Percentage Contribution through each Channel.
10. Total Sold Quantity by Division, Product, Rank Order.

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 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 Service 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.

Three types of Power BI Services are mentioned below:

1 Power BI Desktop

Microsoft Windows application for desktop users. You can install the application from the official site and start using Power BI Desktop on your local machine.

2 Power BI Web App (Power BI Service)

It is an online SaaS (Software as a Solution) Service also which can be accessed via any browser. It provides the same environment and feel like the Power BI Desktop, which an advantage that you can access and use in the browser itself without downloading it.

3 Mobile Power BI

Available for tablets and mobile phones.

6 Report


Market Distribution of Atliq Exclusive in the APAC Region
EUROPE
ASIA
AFRICA
Japan
Bangladesh
South Kore
Philiphines
India
Australia
Indian Ocean
AUSTRALIA
Newzealand
© 2022 TomTom, © 2023 Microsoft Corporation, Terms
© OpenStreetMap
Microsoft Bing
Segment Wise Product Count
Product Count
100
0
129
116
84
32
27
9
Noteb...
Access...
Periph...
Desktop
Storage
Netwo...
Top 5 Customers with High Average Discount
Flipkart 31%
Croma 30%
Ezone 30%
Viveks 30%
Amazon 29%
Gross Sales and Percentage Contribution through each Channel
₹ 257... (15....)
₹ 188.03 (11.3%)
₹ 1,21... (73.2...)
Channel
Retailer
Direct
Distributor
Monthly Gross Sales Amount for Fiscal Year 2020 and 2021
Year 2019 2020 2021
Gross Sales A...
₹ 40M
₹ 20M
₹ 0M
February
March
April
May
June
July
August
September
October
November
December
Months
Product Count 2020 and Product Count 2021 by Segment
Sum of product_count_2020
Sum of product_count_2021
Segment
Storage 12
Peripherals 59 75
Notebook 92 108
Networking 6
Desktop 7 22
Accessories 69 103
0
50
100
Product Count 2020 and Product Count 2021
Difference by Segment
5
16
16
3
15
34
0
20
Difference
Total Sold Quantity by Division, Product, Rank Order
Total Sold Quantity
0.5M
0.0M
701.373K
428.498K
17.434K
N & S 1
N & S 2
N & S 3
P & A 1
P & A 2
P & A 3
PC 1
PC 2
PC 3
A...
AQ Pen...
A...
AQ Ma...
A...
A...
A...
Rank Order
Highest and Lowest Costing Products
Products
AQ HOME Alli...
₹ 240.5364
AQ Master wi...
₹ 0.8920
₹ 0
₹ 200
Total Sold Quantity Per Quarter of 2020
Total Sold Quantity
5M
0M
7.0M
6.6M
2.1M
5.0M
Q1
Q2
Q3
Q4