High Level Design

Data Analysis

Written By	SHAAD ALI
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Abstract

To run a government or any organization, it is important to manage expenses. It's a way by which any government can handle its economy. So, in this project we are going to analyse some key features that describe how well a state government is in managing its economy. For this purpose, we will get our data from NITI Aayog. The NITI Aayog is developing itself as a state-of-the-art resource centre with the necessary knowledge and skills that will enable it to act with speed, promote research and innovation, provide strategic policy vision for the government, and deal with contingent issues. NITI Aayog is a **National Institution for Transforming India**) serves as the apex public policy think tank of the Government of India, and the nodal agency tasked with catalysing economic development, and fostering cooperative federalism through the involvement of State Governments of India in the economic policy-making process using a bottom-up approach.

Keywords: Analysis, Expenditure, State, Government, Policy.

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:
  - o Security
  - o Reliability
  - o Maintainability
  - o Portability
  - o Reusability
  - o Application compatibility
  - o Resource utilization
  - o 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

No business can survive in this competitive market without managing their cost. It does not matter if revenues are high but if cost is higher; it is a red flag. So you are tasked to help management in creating and establishing new structure and models to reduce cost.

The objective of the 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 Tableau or Power BI, Python, MS Excel & SQL to get a visual understanding of the data.

2.2 Tools used

Business Intelligence tools and Python libraries such as NumPy, Pandas, Pandas Profiling, Matplotlib, Seaborn, Excel, SQL, Snowflake, Tableau or Power BI are used to build the whole framework.
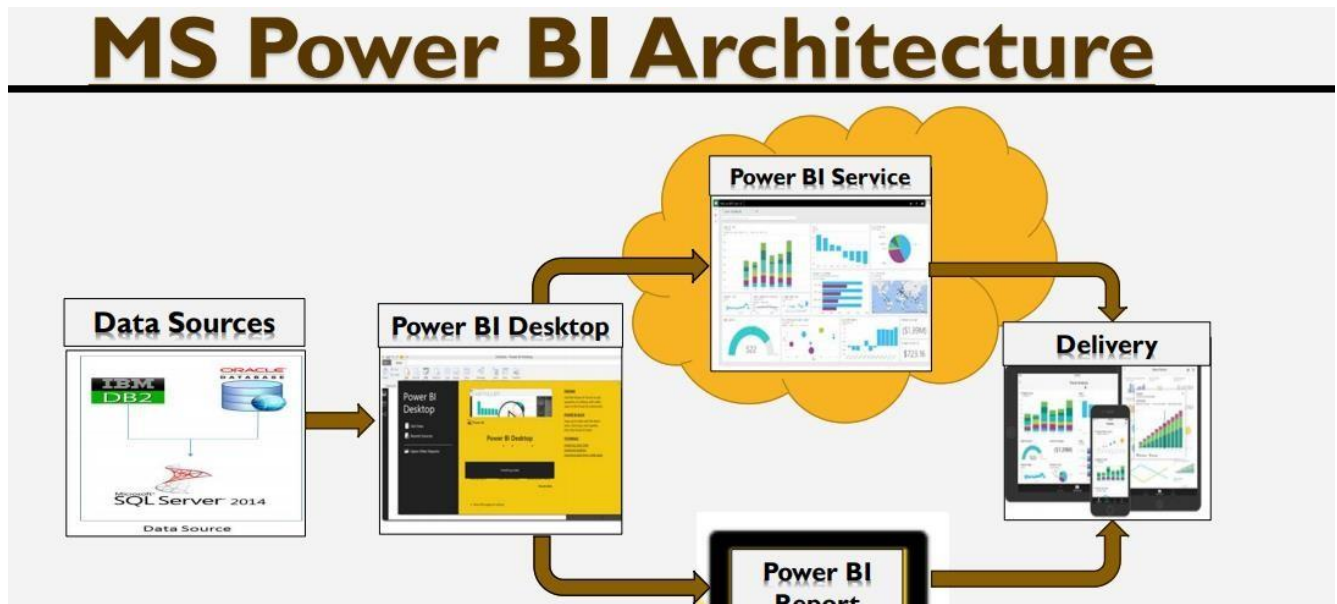
3 Design Details

3.1 MS Power BI Architecture

Fig: Architecture of Power BI

3.2 Optimization

Optimization guide for Power BI

You can optimize your solution at different architectural layers. Layers include:
- The data source(s)
- The data model
- Visualizations, including dashboards, Power BI reports, and Power BI paginated reports
- The environment, including capacities, data gateways, and the network.

1. Optimizing the data model

The data model supports the entire visualization experience. Data models are either external-hosted or internal-hosted, and in Power BI they are referred to as *datasets*. It's important to understand your options, and to choose the appropriate dataset type for your solution. There are three dataset modes: Import, Direct Query, and Composite.

For specific dataset mode guidance, see:

- Data reduction techniques for Import modelling
- DirectQuery model guidance in Power BI Desktop
- Composite model guidance in Power BI Desktop

2. Optimizing visualizations

Power BI visualizations can be dashboards, Power BI reports, or Power BI paginated reports. Each has different architectures, and so each has their own guidance.

1) Dashboards

It's important to understand that Power BI maintains a cache for your dashboard tiles—except live report tiles, and streaming tiles.

2Power BI reports

The Power BI Desktop includes the Report View. Select the fields you want, add filters, choose from dozens of visualizations, format your reports with custom colors, gradients and several other options. The Report View gives you the same great report and visualizations tools just like when creating a report on PowerBI.com

3. Optimizing the environment

You can optimize the Power BI environment by configuring capacity settings, sizing data gateways, and reducing network latency.

4 KPIs

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

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4.1 KPIs (Key Performance Indicators)

Key indicators displaying a summary of Every year Expenditures and its relationship with different metrics

1. Impact of Aggregate Expenditure on states.
2. Impact of Capital Expenditure on states.
3. Impact of Gross Fiscal Deficits on states.
4. Influence of Nominal GDP Series on states.
5. Influence of Own Tax Revenues on states.
6. Influence of Revenue Deficits on states.
7. Influence of Revenue Expenditure on states.
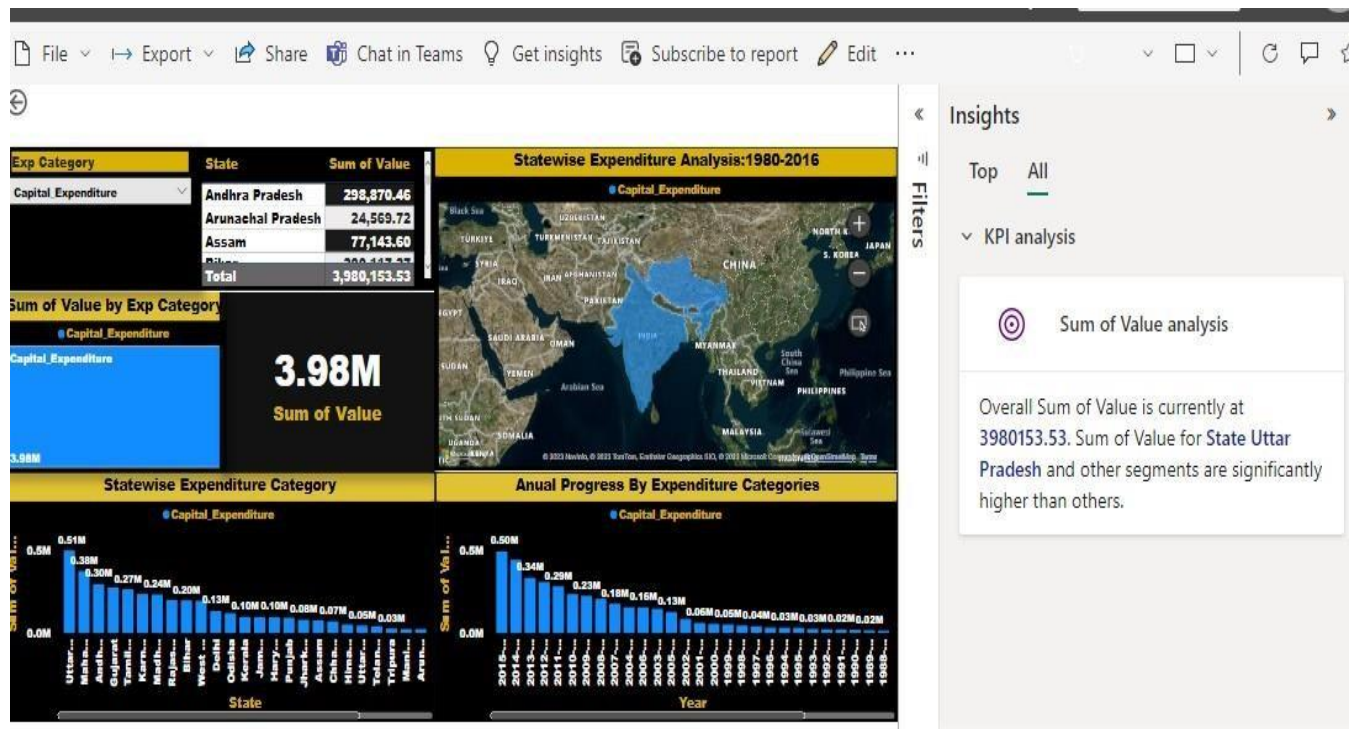8. Influence of Social Sector Expenditure on states.

Fig: Insightful Dashboard with KPI

In above dashboard its clearly shows that when we already filter by expenditure category, selected as Capital Expenditure its gives as corresponding values spending in 3.98 millions shows in card, State wise analysis and Annual progress of all states in India shows in map and table.

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 analysing 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. Power BI Server and Power BI 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:

Power BI Types:

1. 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)

2. Power BI Desktop

• 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)

Novypro:

Novypro is the most creative Business Intelligence portfolio that can host Power BI, Tableau, Astrato, or Excel projects and dashboards. novyPro.com is Free to use.

Depending on your organizational roles and responsibilities, Power BI Desktop 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 Power BI Server or integration and configuration of Power BI Online with login through Microsoft Developer Account. We can create dashboards by using Power BI Desktop, Power BI service and publish on **Novypro** Power BI service and Power BI Mobile.