

Low-Level Design (LLD)
Crop Production Analysis in India

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1 Introduction

1.1 What is a Low-Level Design Document?

The goal of the LDD or Low-level design document (LLDD) is to give the internal logic design of the actual program code for the House Price Prediction dashboard. LDD describes the class diagrams with the methods and relations between classes and program specs. It describes the modules so that the programmer can directly code the program from the document.

1.2 Scope

Low-level design (LLD) is a component-level design process that follows a step-by-step refinement process. The process can be used for designing data structures, required software architecture, source code, and ultimately, performance algorithms. Overall, the data organization may be defined during requirement analysis and then refined during data design work.

2 Architecture

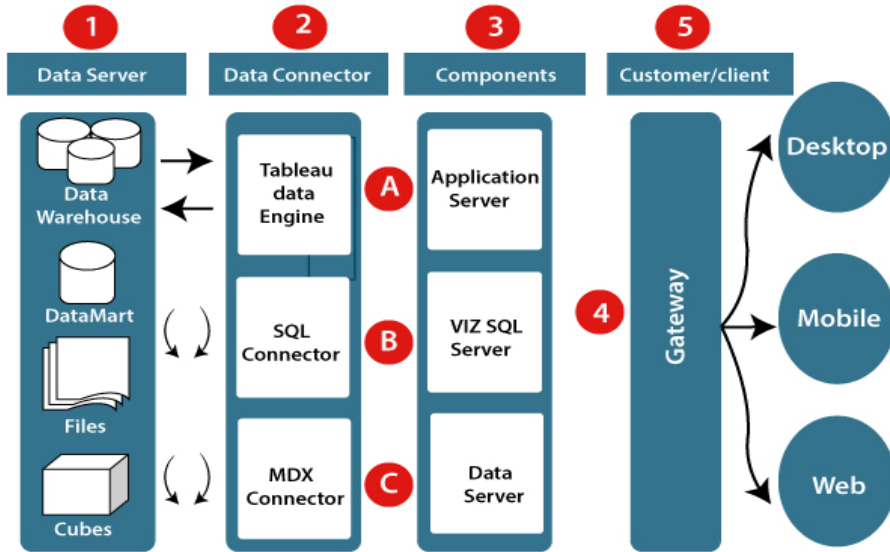


Tableau Server Architecture

Tableau has a highly scalable, n-tier client-server architecture that serves mobile clients, web clients, and desktop-installed software. Tableau Server architecture supports fast and flexible deployments.

The following diagram shows Tableau Server's architecture:

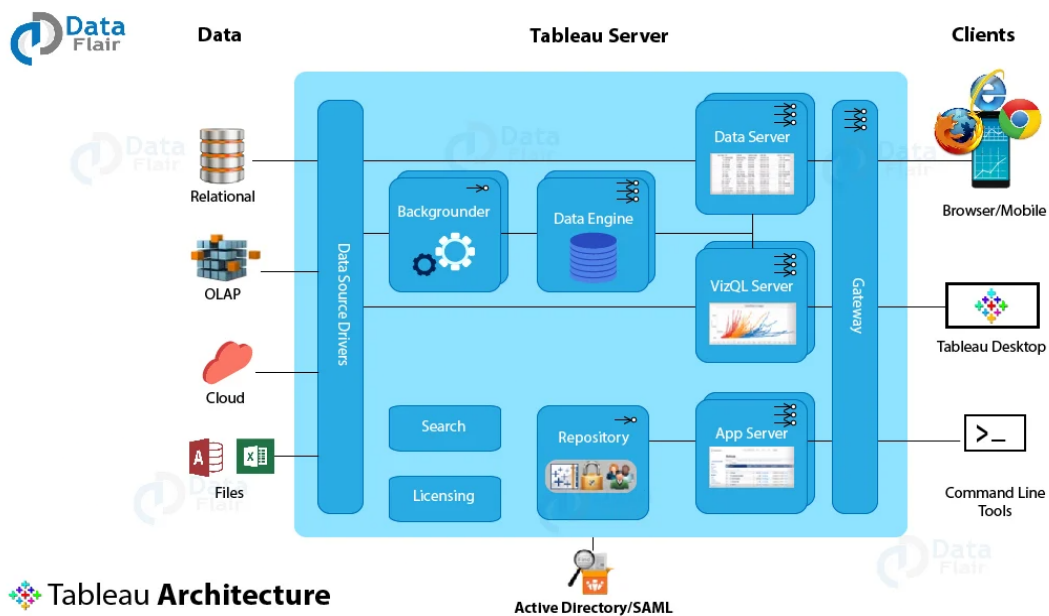


Tableau Server is internally managed by multiple server processes.

1. Gateway/Load Balancer

It acts as an Entry gate to the Tableau Server and also balances the load to the Server if multiple processes are configured.

2. Application Server

Application Server processes (wgserver.exe) handle browsing and permissions for the Tableau Server web and mobile interfaces. When a user opens a view in a client device, that user starts a session on Tableau Server. This means that an Application Server thread starts and checks the permissions for that user and that view.

3. Repository

Tableau Server Repository is a PostgreSQL database that stores server data. This data includes information about Tableau Server users, groups and group assignments, permissions, projects, data sources, and extract metadata and refresh information.

4. VIZQL Server

Once a view is opened, the client sends a request to the VizQL process (vizqlserver.exe). The VizQL process then sends queries directly to the data source, returning a result set that is rendered as images and presented to the user. Each VizQL Server has its own cache that can be shared across multiple users.

5) Data Engine:-

It Stores data extracts and answers queries.

6) Backgrounder:-

The backgrounder Executes server tasks which include refreshing scheduled extracts, and tasks initiated from tab cmd, and manages other background tasks.

7) Data Server:-

Data Server Manages connections to Tableau Server data sources. It also maintains metadata from Tableau Desktop, such as calculations, definitions, and groups.

3. Architecture Description:

3.1 Data Sourcing

The dataset is in CSV (comma-separated values) format. MS Excel is used to load the data.

Citation Request:

This Dataset is publicly available for research, Available at:
<https://data.world/thatzprem/agriculture-india>
named crop_production.csv

1. Title - India Crop Production - State wise
2. Source - <https://data.world/thatzprem/agriculture-india>

3.2. Data Overview

- The Data includes a single .csv file with all examples, ordered by date (The year 1997 to the Year 2015).
- The Number of Instances - 246091 for crop_production.csv
- Number of attributes – 7 attributes

3.3 Data Description –

- State_name : Name of States in India (categorical : 'Andaman and Nicobar Islands', 'Andhra Pradesh', 'Arunachal Pradesh', 'Assam', 'Bihar', 'Chandigarh', 'Chhattisgarh', 'Dadra and Nagar Haveli', 'Goa', 'Gujarat', 'Haryana', 'Himachal Pradesh', 'Jammu and Kashmir ', 'Jharkhand', 'Karnataka', 'Kerala', 'Madhya Pradesh', 'Maharashtra', 'Manipur' , 'Meghalaya', 'Mizoram', 'Nagaland', 'Odisha', 'Puducherry', 'Punjab', 'Rajasthan', 'Sikkim', 'Tamil Nadu', 'Telangana ', 'Tripura', 'Uttar Pradesh', 'Uttarakhand', 'West Bengal')
- Dsitrict_Name : Name of Districts in India (categorical: 'NICOBARS', 'NORTH AND MIDDLE ANDAMAN', 'SOUTH ANDAMANS', 'ANANTAPUR', 'CHITTOOR', 'EAST GODAVARI', 'GUNTUR', 'KADAPA', 'KRISHNA', 'KURNOOL', 'PRAKASAM', 'SPSR NELLORE', 'SRIKAKULAM', 'VISAKHAPATANAM', 'VIZIANAGARAM', 'WEST GODAVARI', 'ANJAW', 'CHANGLANG', 'DIBANG VALLEY', 'EAST KAMENG', 'EAST SIANG', 'KURUCropNG KUMEY', 'LOHIT', 'LONGDING', 'LOWER DIBANG VALLEY', Etc)
- Crop_Year : Year of Crop Production (Numerical: 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2010, 1997, 1998, 1999, 2007, 2008, 2009, 2011, 2012, 2013, 2014, 2015)
- Season – Season of the Crops (Categorical: 'Kharif', 'Whole Year ', 'Autumn', 'Rabi', 'Summer', 'Winter')
- Crop – Name of the Crop Sown (Categorical: 'Arecanut', 'Other Kharif pulses', 'Rice', 'Banana', 'Cashew', 'Coconut ', 'Dry ginger', 'Sugarcane', 'Sweet potato', 'Tapioca', 'Black pepper', 'Dry chillies', 'other oilseeds' , Etc)
- Area – Area Under cultivation (Numerical)
- Production – Production of the crops (Numerical)

3.4 Insights from Visualization

CROP PRODUCTION ANALYSIS | INDIA

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Situation: The need for an overall view of crop production and insights into the data provided.


Task: Develop a dashboard that provides an overall view of crop production, including the total number of crops grown, seasons of production, production in tons, and area used in hectares. The dashboard will allow for insightful analysis of the provided data.

Action:

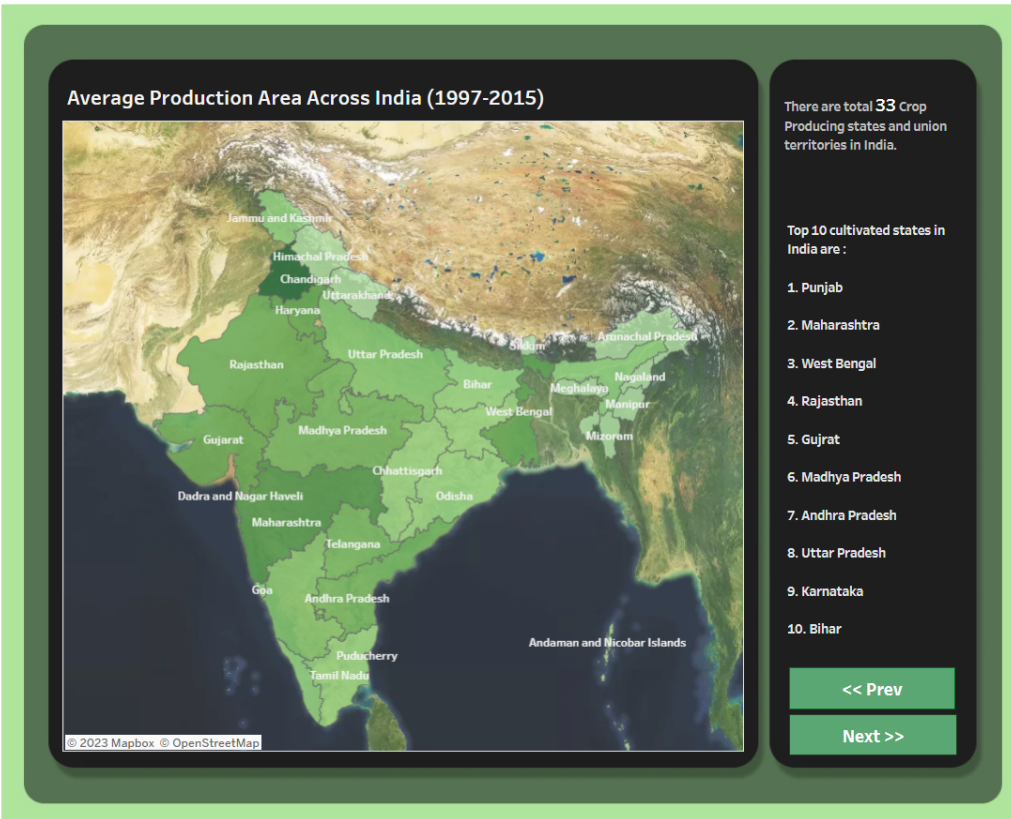
- Develop an interactive dashboard using data from past crop production records
- Prepare a report summarizing key findings and insights from the data analysis

Result:

- A functional dashboard that can be accessed via a web browser
- A report summarizing key findings and insights from the data analysis



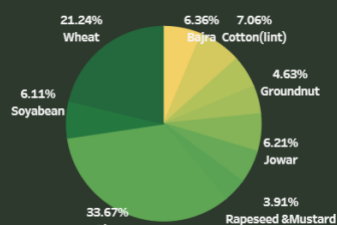




Most Produced Crops

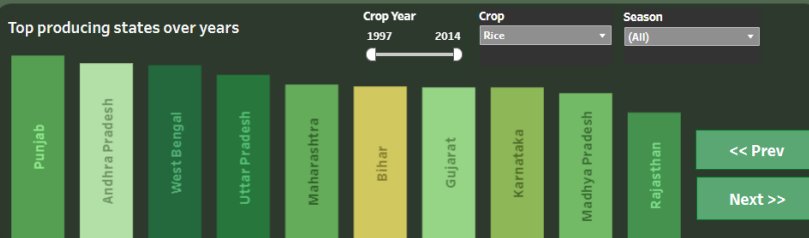
Crop	Avg. Area (in ...)	Avg. Produ...	Ratio
Wheat	59,750	169,183	2.83
Rice	49,484	106,449	2.15
Cotton(lint)	35,728	67,777	1.90
Soyabean	42,581	44,589	1.05
Bajra	26,207	24,109	0.92
Maize	8,812	19,826	2.25
Jowar	19,694	16,395	0.83
Gram	16,354	13,756	0.84
Groundnut	11,711	12,742	1.09
Rapeseed & Mustard	11,492	12,063	1.05

Area consumed by top 10 Crops in India

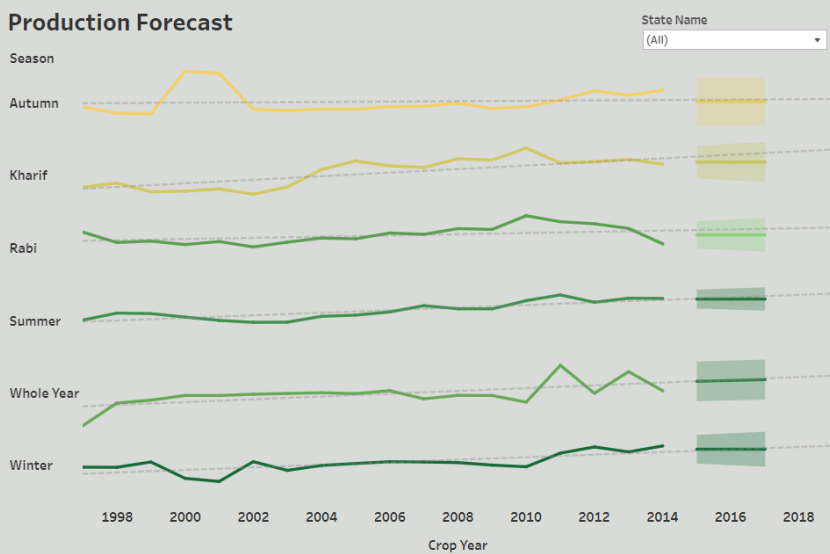


Among the top 10 crops grown in India during 1997-2015, 54.91% of total land was under two crops i.e. Rice and Wheat respectively.

Top producing states over years



Production Forecast



There are total 6 seasons under which crops are produced in India: Summer, Winter, Whole Year, Kharif, Rabi and Autumn.

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