Data-Driven Technologies in Directorate General of Treasury

The Implementation of Data Science in the Directorate General of Treasury

Directorate General of Treasury
Jakarta, April 2024

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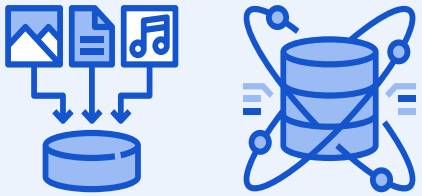
Introduction

Background

Within the context of the Directorate General of Treasury, Data Science and Artificial Intelligence are being leveraged to improve financial management, decision-making, and operational efficiency within the organization.

The implementation of data science using advanced analytics techniques to analyze financial data, identify patterns, forecast trends, optimize processes, and make data-driven decisions.

Structure



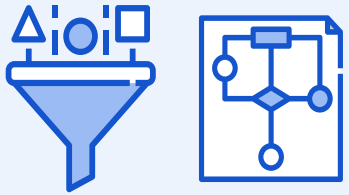
Data Source

INTERNAL

- SPAN
- SAKTI
- DIGIT
- Data Survey Region Office/KPPN
- Other Internal Data

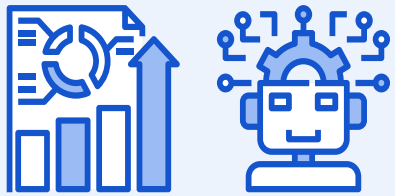
EKSTERNAL

- Statistical Bureau
- Bloomberg Data
- Other Source



Data Process

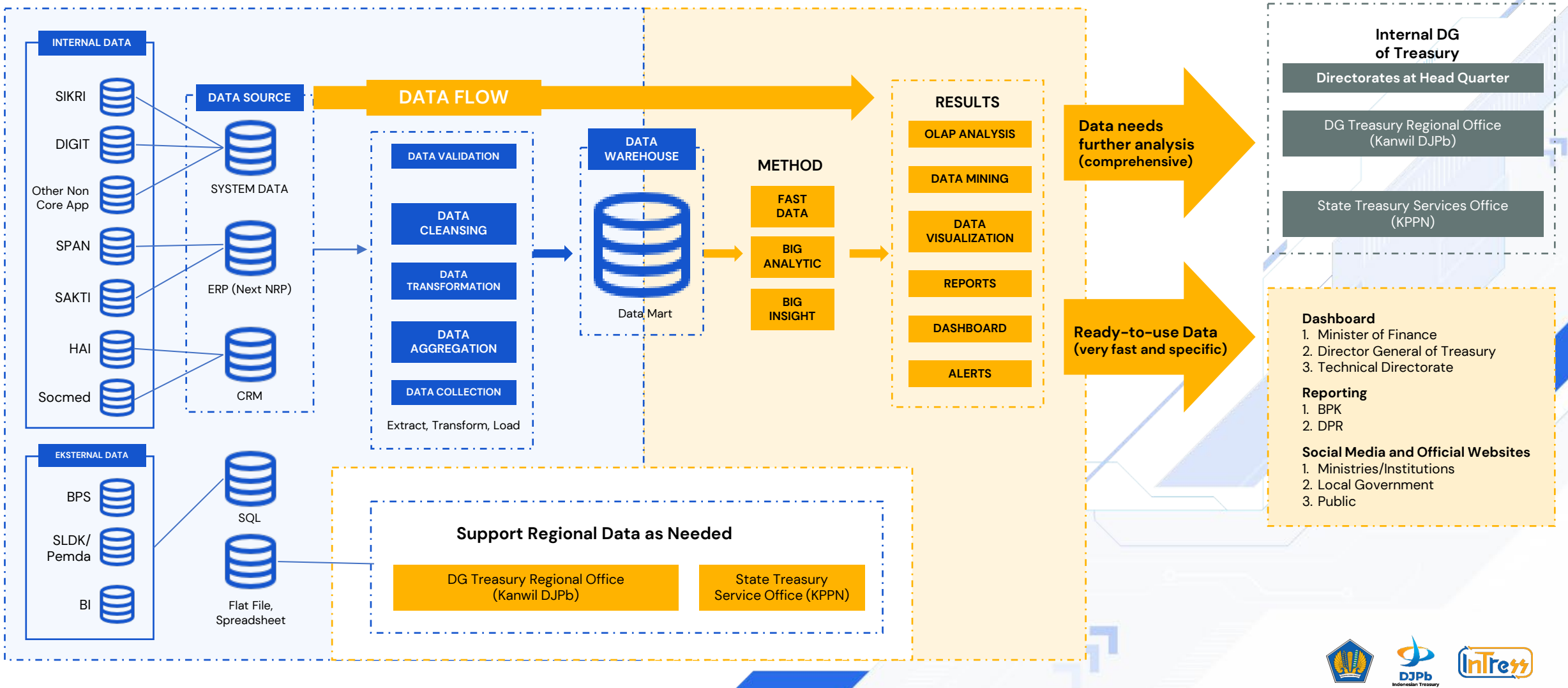
- Data Collection
- Data Validation
- Data Cleansing
- Data Aggregation
- Data Transforming



Output

- Visualization Dashboard
- Open Data
- Facility to Download Data (Transaction and/or Agregation)
- Artificial Intelligence For Decision Making

Introduction



Development Tools

Treasury BigData

Data

Structured

Unstructured

Processing

GUI

Programming

User Interface

Visualization

Platform

Case Development Approach

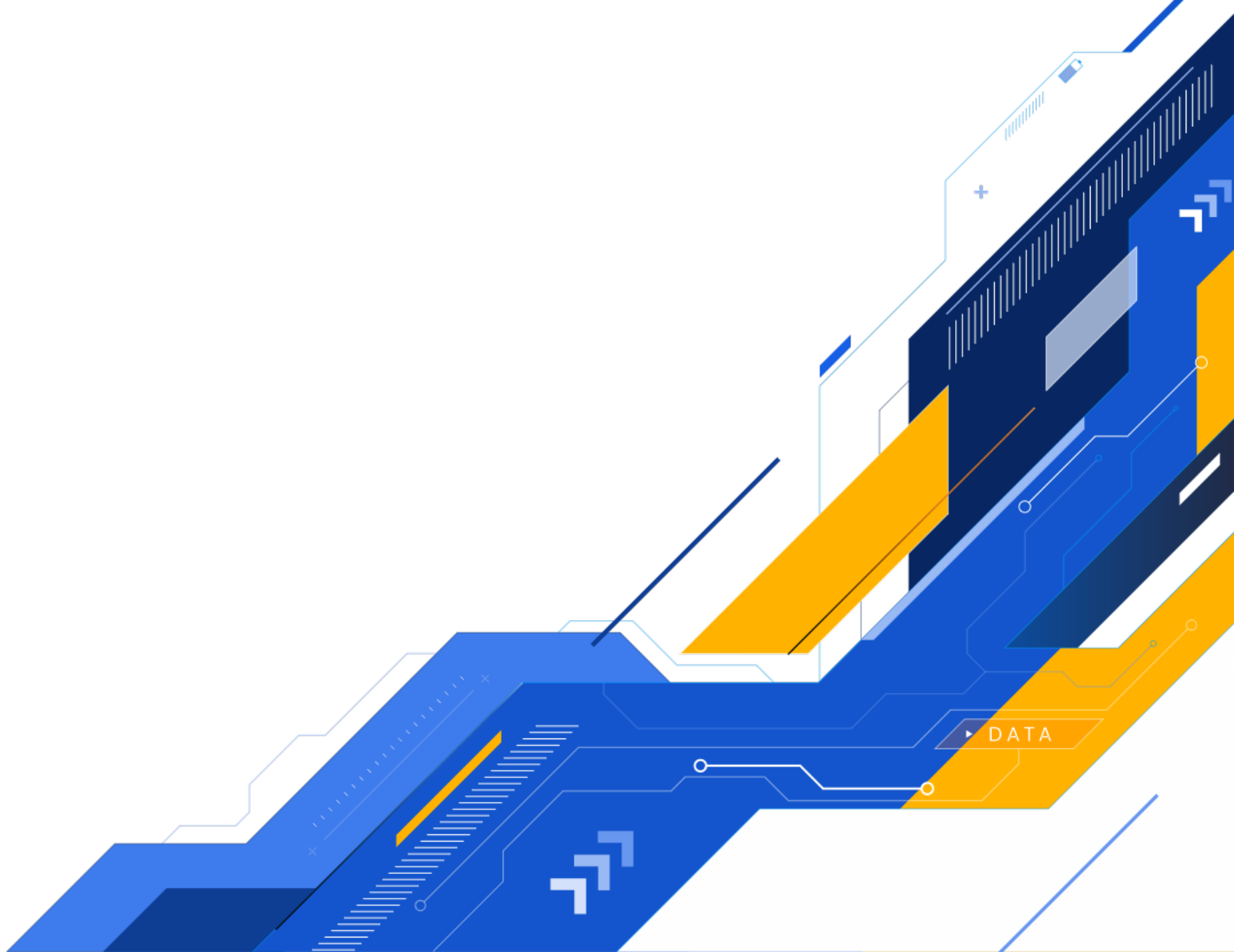
Use Case ?

1. Request from business process owners;
2. Benchmarking from other Countries/ Agencies;
3. Obtained from data analytics competitions;
4. Workshop/ Focus Group Discussions.

Data Analytics Competitions

This Data Analytics Competition is aimed at adapting the skill sets possessed by the DG of Treasury Regional Office (Kanwil DJPb)/State Treasury Services Office (KPPN) employees to be able to complete several new tasks assigned to them.

Projects



Treasury Big Data (Products)

Open Data

Download | Upload | Request

Dynamic Dashboard

Descriptive, Predictive, and Prescriptive Analytics.

Artificial Intelligence

Natural Language Processing;

Digital Assistance (BOT);

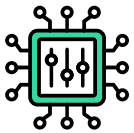
Detection and Recognition.

Data Analytics

Government Expenditure;

Cash Management;

Government Investment.



Machine Learning

Revenue Trajectory;

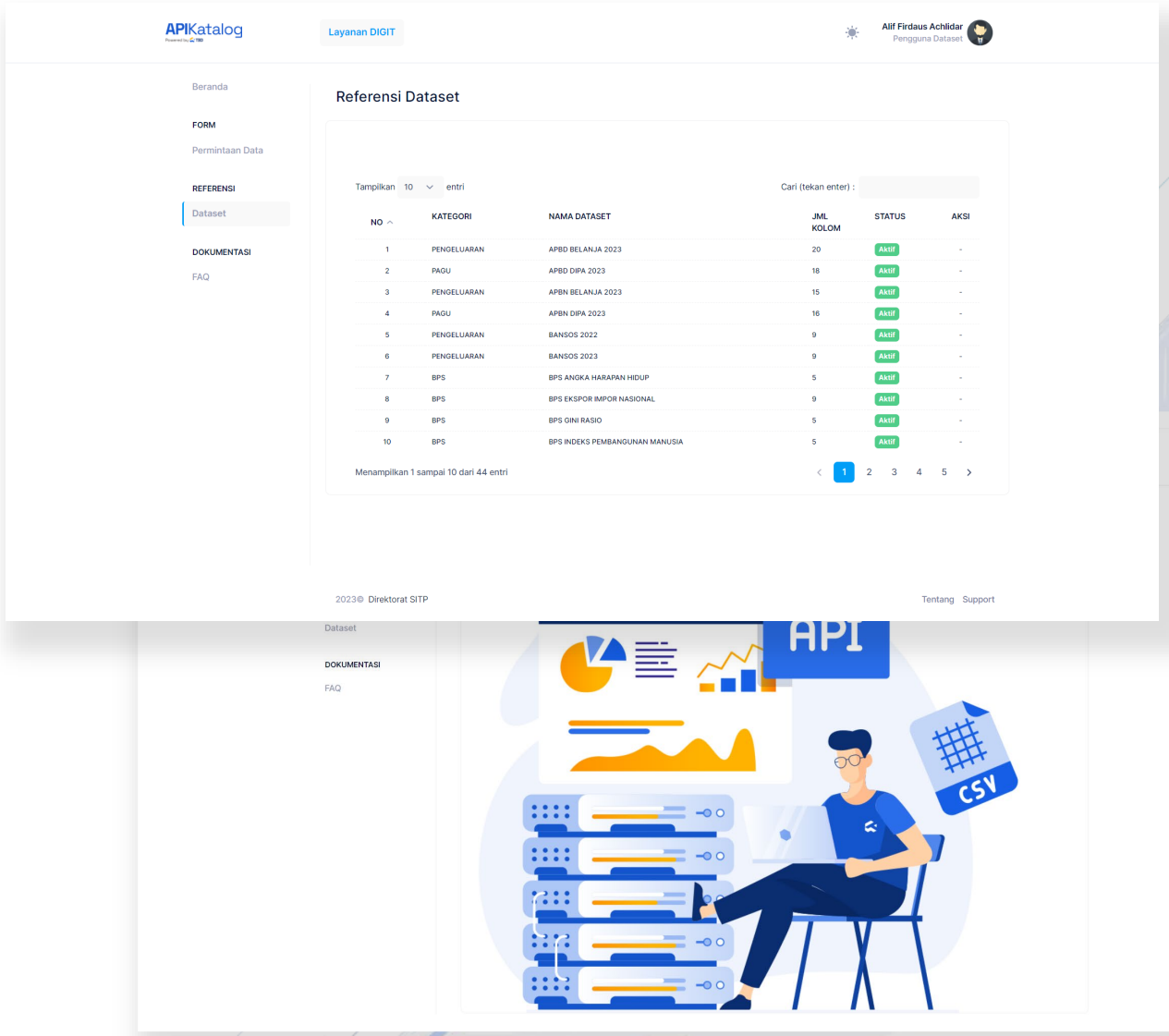
Optimum Cash Buffer (on progress);

Data Labelling on Payments (on progress).

Open Data

Development Background

1. Data needs by stakeholders (Kanwil DJPb & KPPN)
2. The role of Kanwil DJPb as Regional Chief Economist and Financial Advisor
3. Data is scattered from various sources (OM SPAN, MONSAKTI, BPS, Simtrada/SIKD, SIKRI, BI, Regional Government, SIKP, MPN, etc.)
4. Routine data requirements (weekly/monthly), short data preparation time
5. The need for data access both via the internet and intranet



Open Data

Concept

1. Programming interface for data sharing that uses data on Treasury Big Data.
2. Users can choose the required data themselves.
3. The output can be an API link or a CSV/XLS file.
4. Data can be streamed to the system or humans.
5. Can be accessed via the internet or intranet.

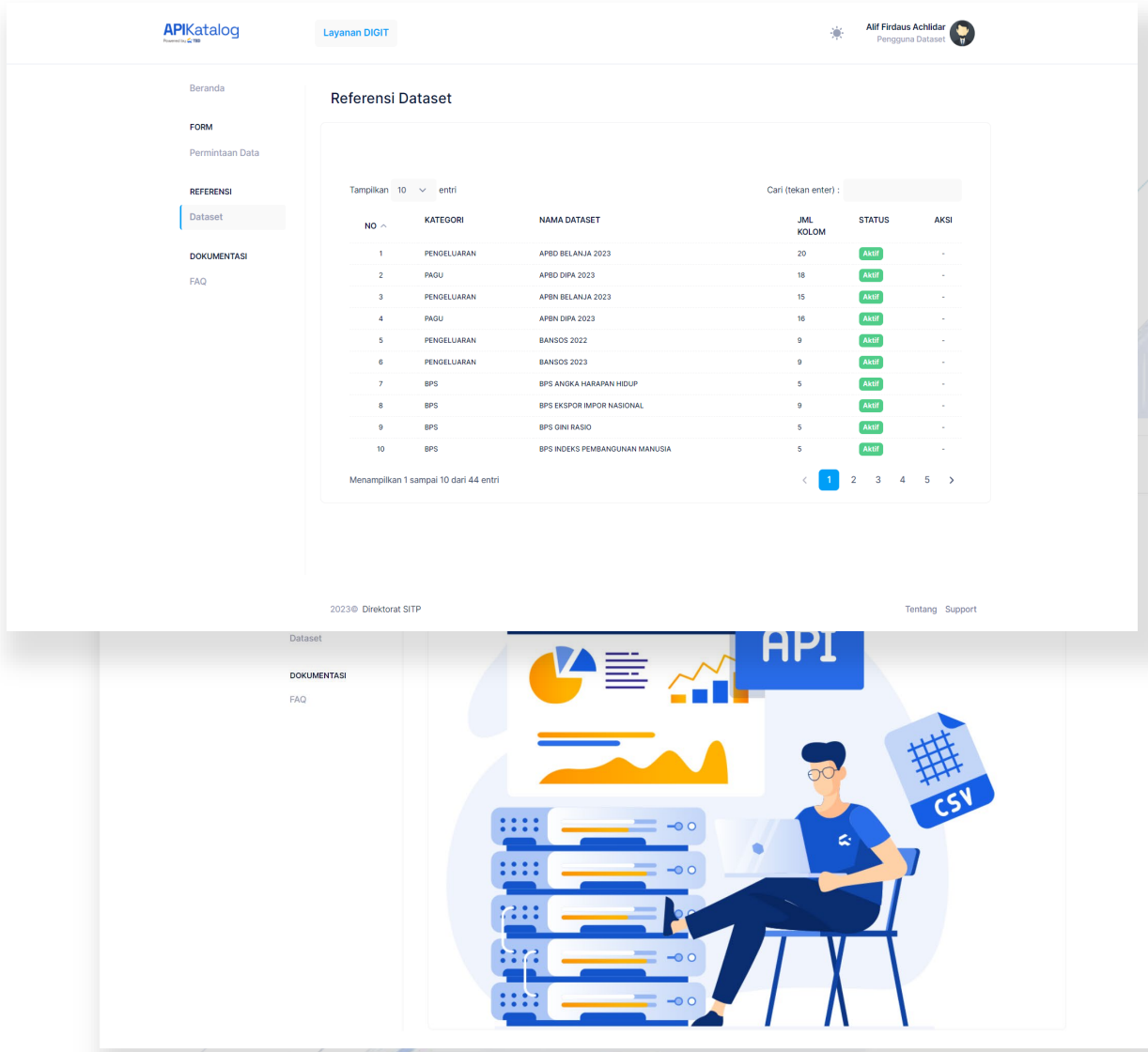
Benefit

Supporting data needs quickly and independently for both internal Ministry of Finance (KPPN, Kanwil DJPb, other Directorates, and Echelon 1) and external to the Ministry of Finance.*

*Adapts to Ministry of Finance regulations

Features

Download Data **Upload Data** **Request Data**



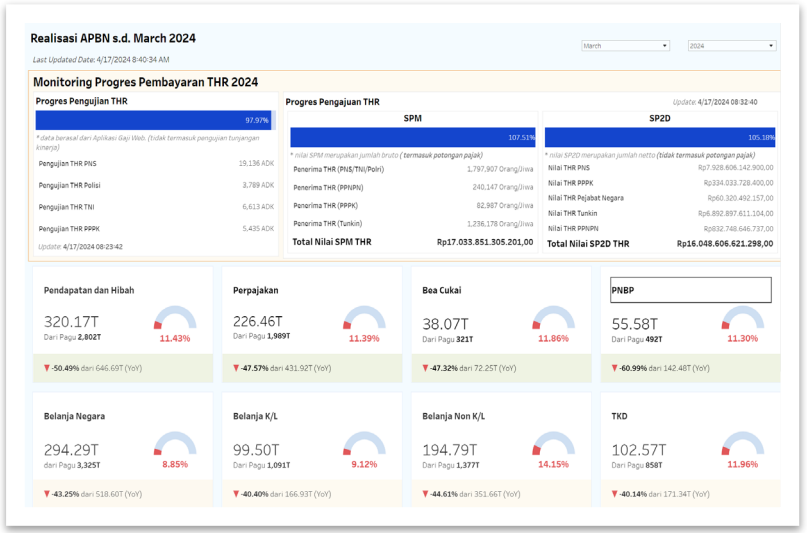
Dynamic Dashboard

Description

Dynamic dashboard used by leaders to monitor the latest business process developments and used by leaders for decision-making.

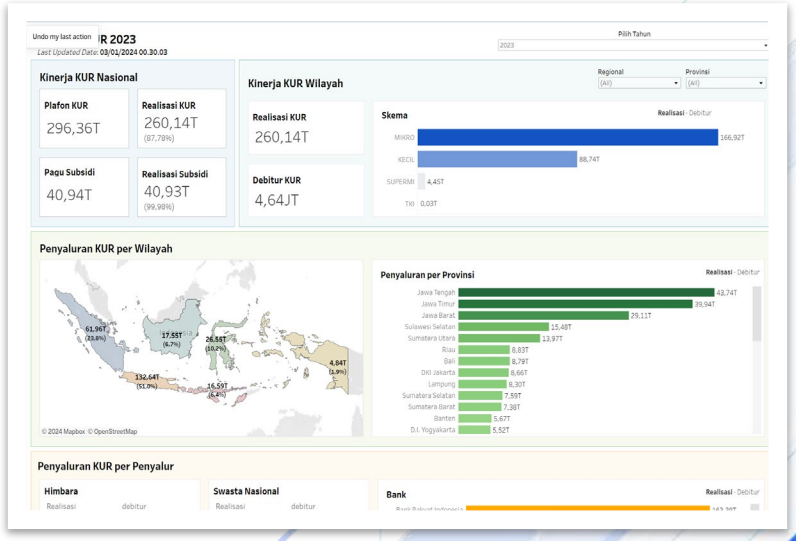
Objectives

The objectives of this dynamic dashboard are to help leaders monitor business process activities and help leaders make more accurate decisions



Leadership Dashboard - APBN realization

Dashboard used by the Director General of Treasury to monitor the realization that has occurred in the year concerned



Government Subsidy

Dashboard used by leaders at the Directorate General of Treasury to see the realization of Government subsidies distribution in the current year on a national and regional scale.

Artificial Intelligence

Development Background

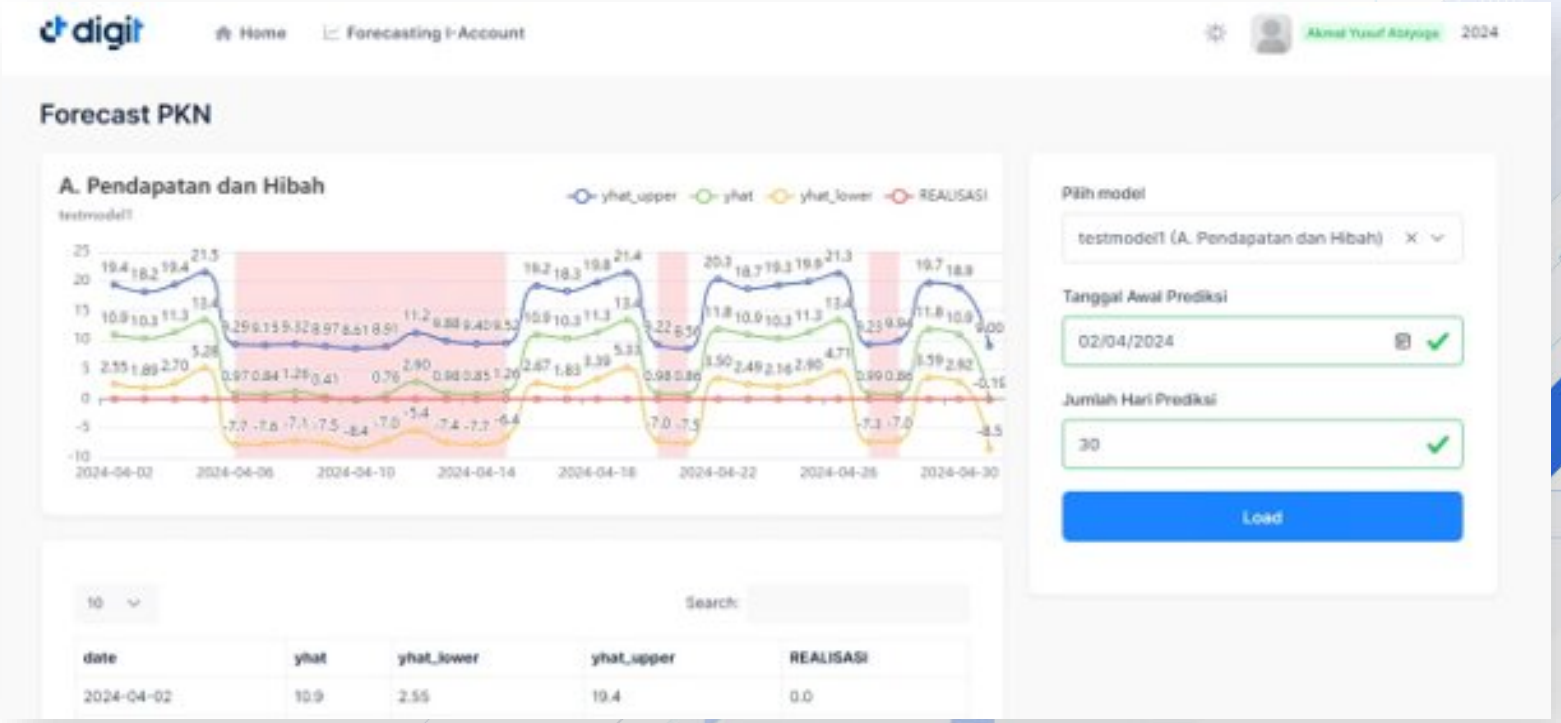
The Ministry of Finance is facing challenges in managing government cash due to the complexity of its duties and the abundance of financial data. With manual analysis becoming more difficult, decision-making is impacted, and it's leading to increased uncertainty and risk. Timely and accurate decisions are vital for financial stability and efficient public services, considering economic changes and political dynamics.

Description

A simulation system that can produce projections of APBN realization based on predetermined scenarios. This includes projections of income, expenditure and other main items in the APBN

Objective

Implementing an IT-based treasury system for APBN simulation, facilitating rapid financial data processing and strategic decision support to maximize government cash management efficiency.



Data Analytics

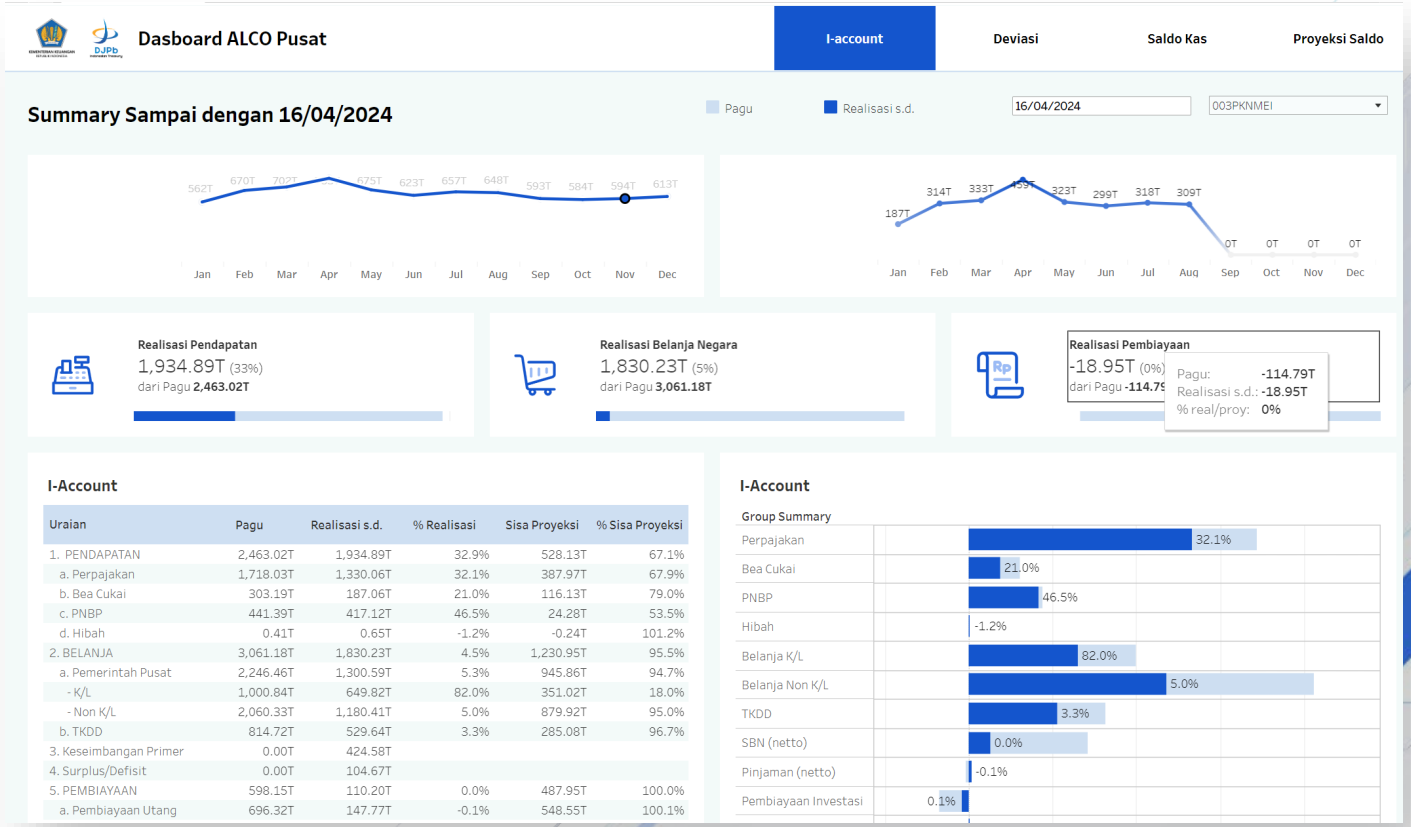
Asset Liability Committee's Dashboard

Development Background

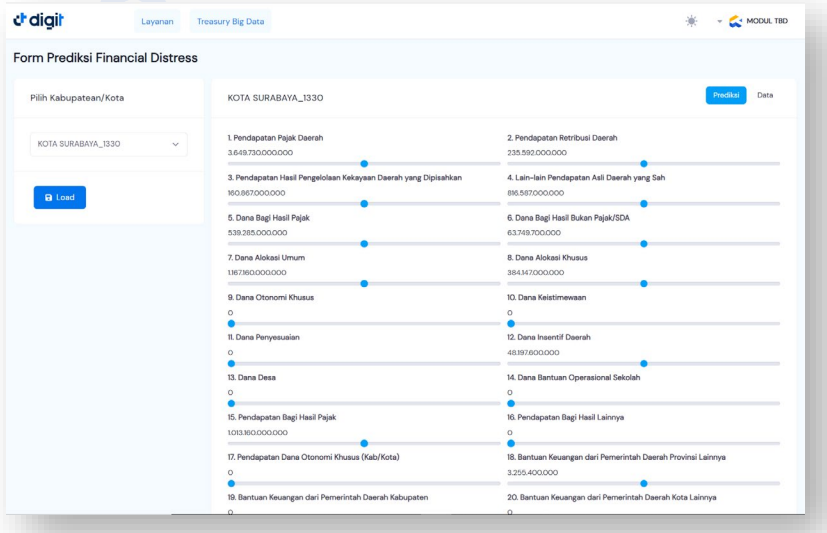
1. Data presentation is still static and does not answer decision-making needs.
2. Preparation of reports to support decision-making is still manual (using Microsoft Excel)
3. There are no projections yet prepared using a Machine Learning (ML) approach

Objective

Providing devices (systems) that provide flexibility in presenting actual and projected data and producing projections using a Machine Learning approach so that they are able to provide input in decision making

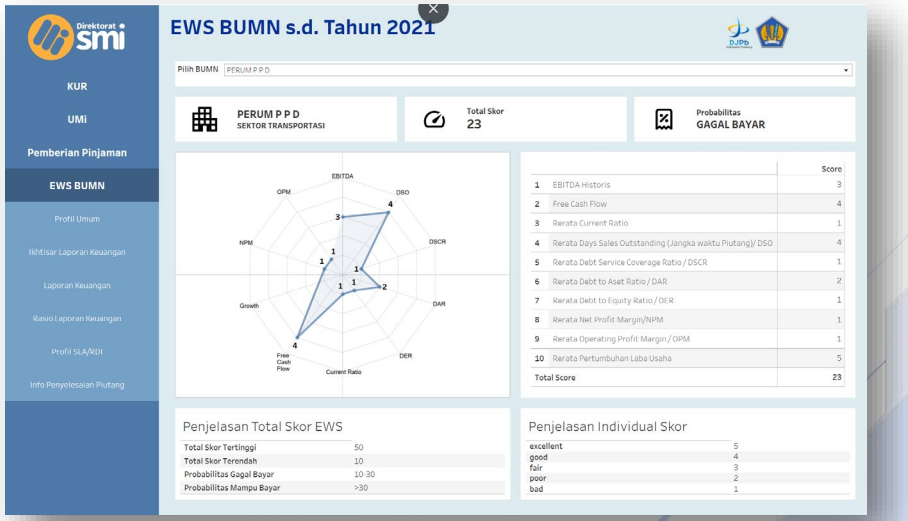


Machine Learning



Financial Distress Pemda

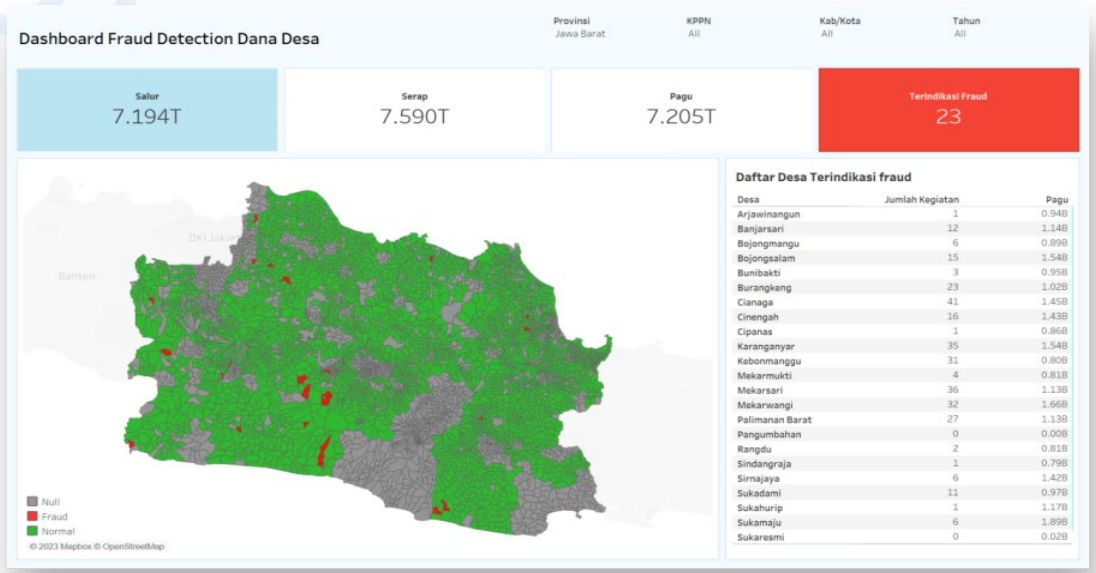
Using machine learning as a risk mitigation effort in predicting debtor (local government) failure to pay. The user selects the name of the Province/City and then adjusts the existing financial components so that the user can predict whether the debt can be paid or not



Early Warning System For State-Owned Enterprise

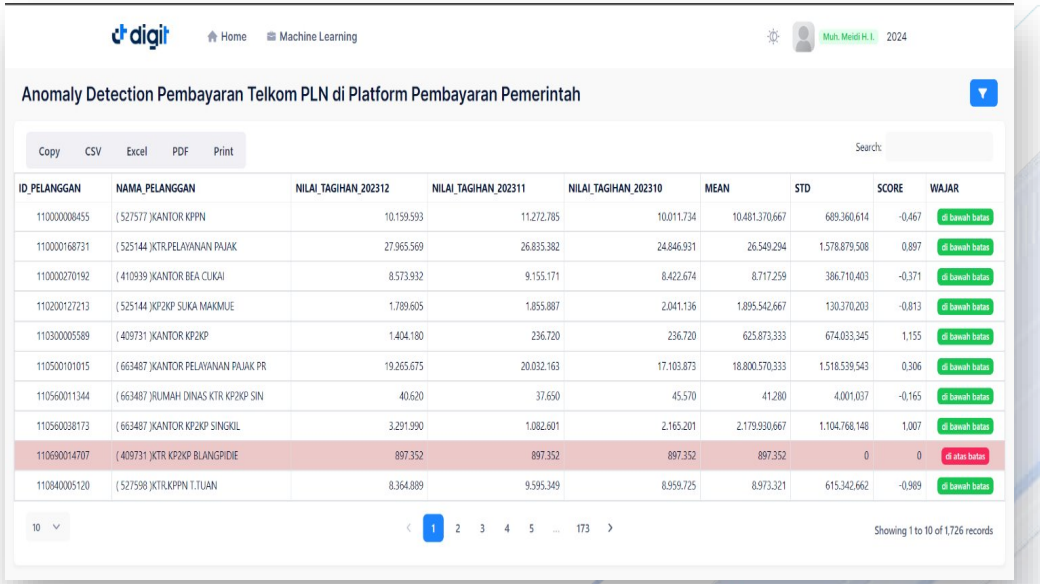
Platform to determine the payment capacity of state-owned enterprises as a step to prevent payment failures of state-owned enterprises.

Machine Learning



Fraud Detection Utilization of Village Funds

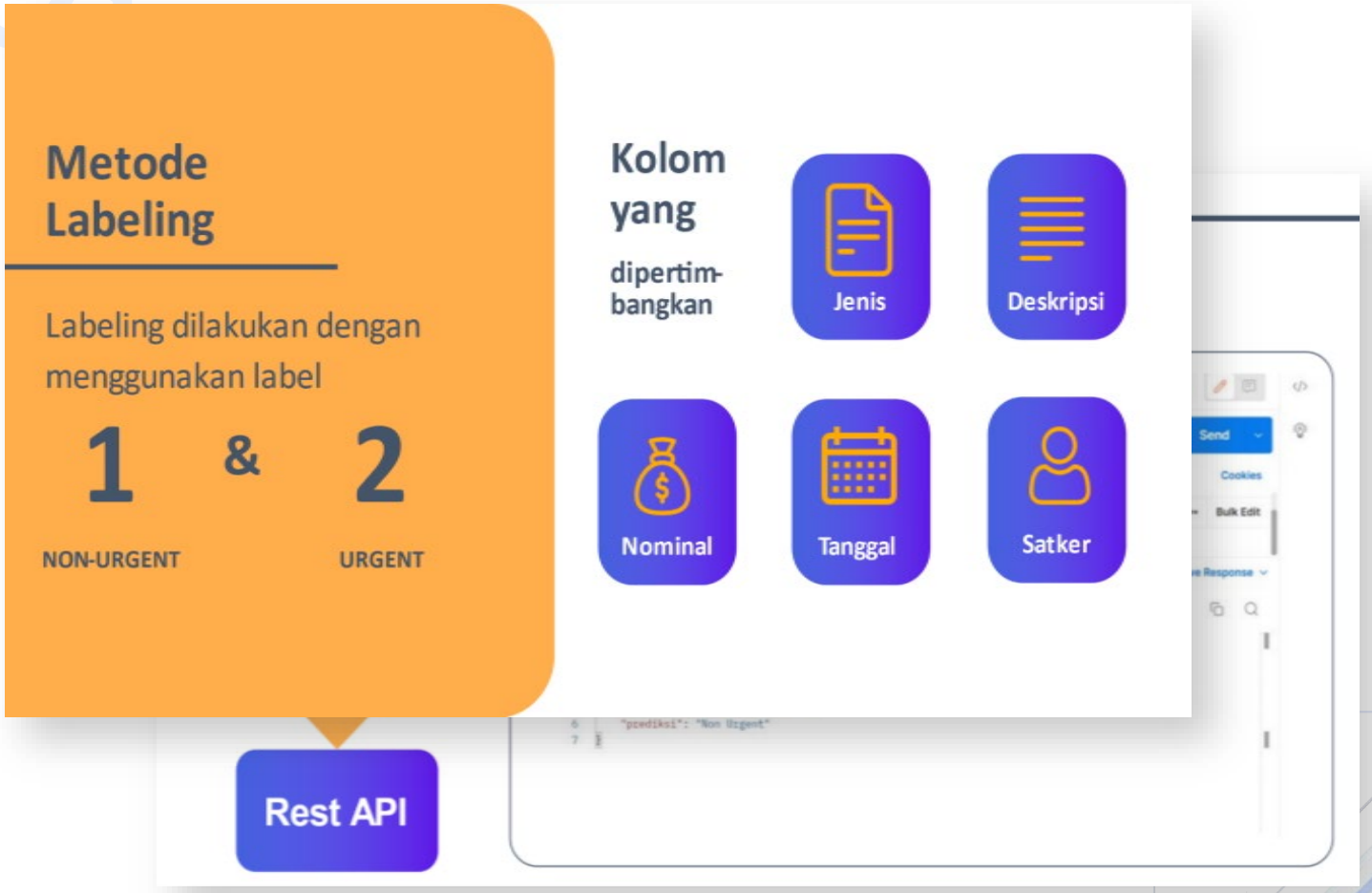
Machine Learning technique used to identify unusual patterns in terms of Village Fund distribution.



Anomaly Detection PPP

It is used to identify data or events that are unusual or do not match existing patterns in the Government Payment Platform (PPP) data set using machine learning.

Machine Learning



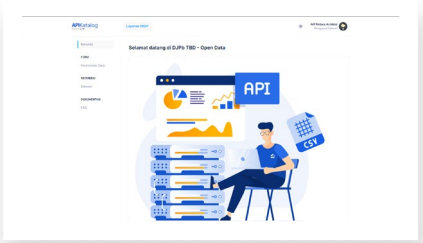
SPM/SP2D (Disbursement Documents) Labeling to Determine Payment Priorities

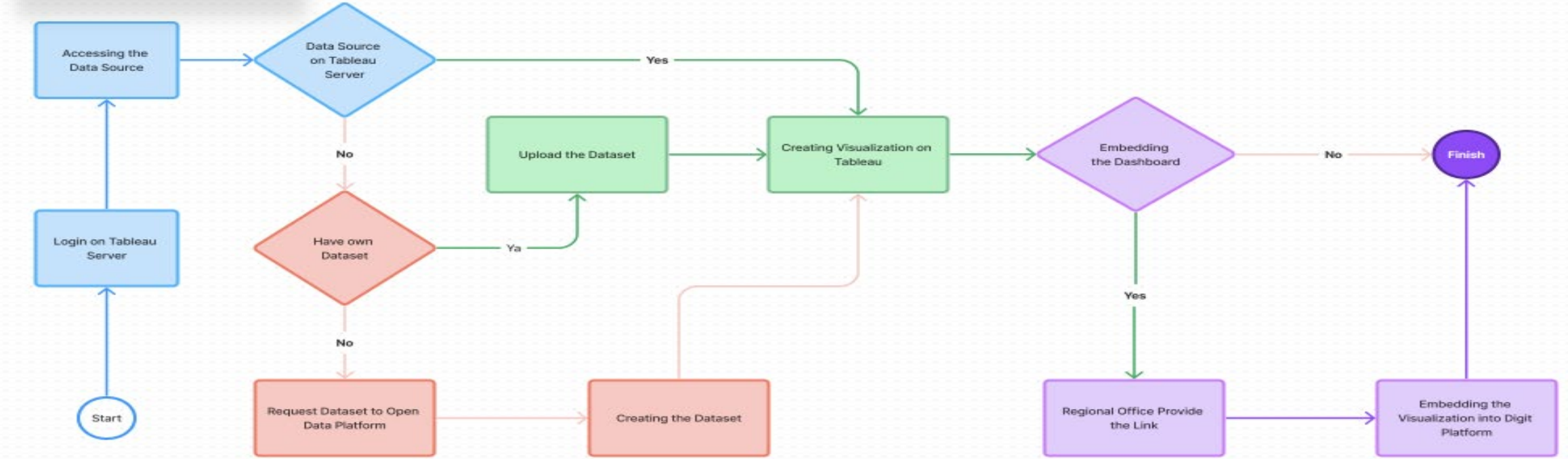
Description

Machine Learning for classifying SPM which is processed into SP2D based on the level of urgency.

Future Works

Integrated Platforms





Developing an integrated platform that will be used by the Regional Office of the Directorate General of Treasury (Kanwil DJPb) and the State Treasury Services Office (KPPN).

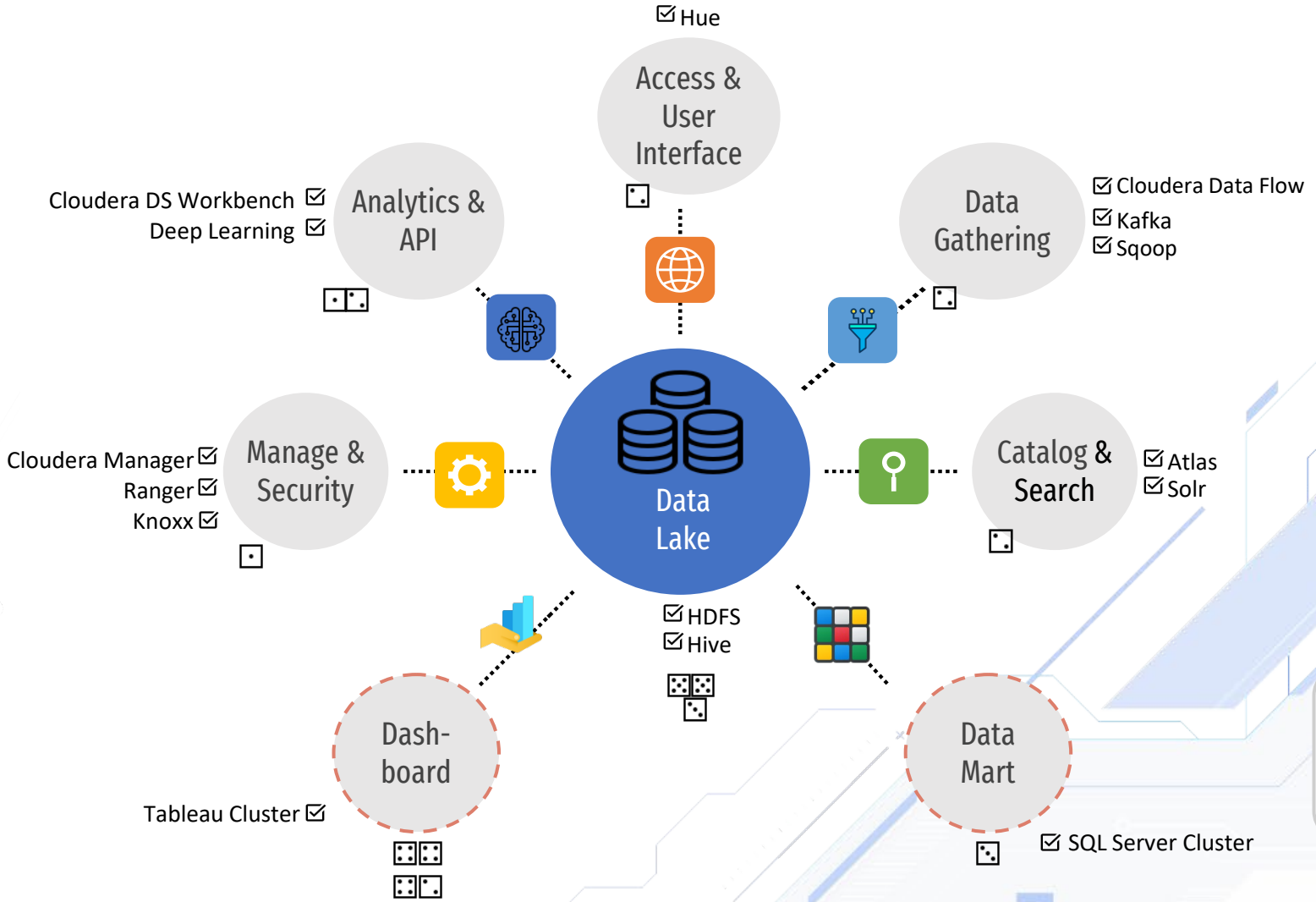
Natural Language Processing

Using non-structured data from HAI (customer service platform in DG of Treasury) as a dataset using NLP and making it as a database for answering the questions from stakeholder s using Chatbot

Computer Vision and Image Recognition

Mitigating the risk and early fraud detection for the internal compliance division by scrapping employee social media picture and compare it with their salary profiles

Enhancing Treasury Big Data Environment for the Next Data Science Projects



THANK YOU

DJPb
Indonesian Treasury

KEMENKEU MELAYANI LEBIH BAIK