PETRONAS

Integrity Operating Window Data in EDH & Monitoring Dashboard

Project Kick Off Meeting

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PETRONAS Group adopts zero tolerance against all forms of bribery and corruption. As an employee, it is incumbent upon each and everyone of us to internalise and abide by the PETRONAS Code of Conduct and Business Ethics (CoBE) & Anti-Bribery and Corruption (ABC) Manual while remain guided by our shared values of loyalty, integrity, professionalism and cohesiveness.

Table of Content

About the project
- Project Background
- Project Goal, Business Drivers & Product Vision
- Overview of Data Architecture

Key Outcomes
- Data Dictionary
- Data Quality at Source
- Data Liberalization via EDH
- Data Serving via IOW Dashboard

Delivery Approach

Project Structure

Project Timeline
- Overall Timeline & Key Milestones
- Business Engagement: Expectations & Value Unlock

Other Project Items
- Key Successful Factors
- Assumptions and Out of Scope
- Potential Risks and Mitigation Plans

Project Background

Integrity Operating Window (IOW) : Established limits for process variables (parameters) that can affect the integrity of the equipment if the process operation deviates from the established limits for a predetermined length of time (includes critical, standard and informational IOW's).

Identified IOW operating process parameters require extensive monitoring in order to manage or mitigate both short-term and long-term materials degradation mechanisms, such as corrosion, creep and stress corrosion cracking.

Therefore, operation of a unit within a defined IOW threshold is necessary to be established, maintained and controlled in order to prevent any significant process upsets and unplanned shutdowns due to fixed equipment failure or corrosion.

Project Goal, Business Driver, Product Vision

Project Goal:

The goal of this project is to build IOW Dashboard to monitor critical IOW process parameters and deviation as guided by Corrosion Monitoring and Mitigation Program (CMMP).

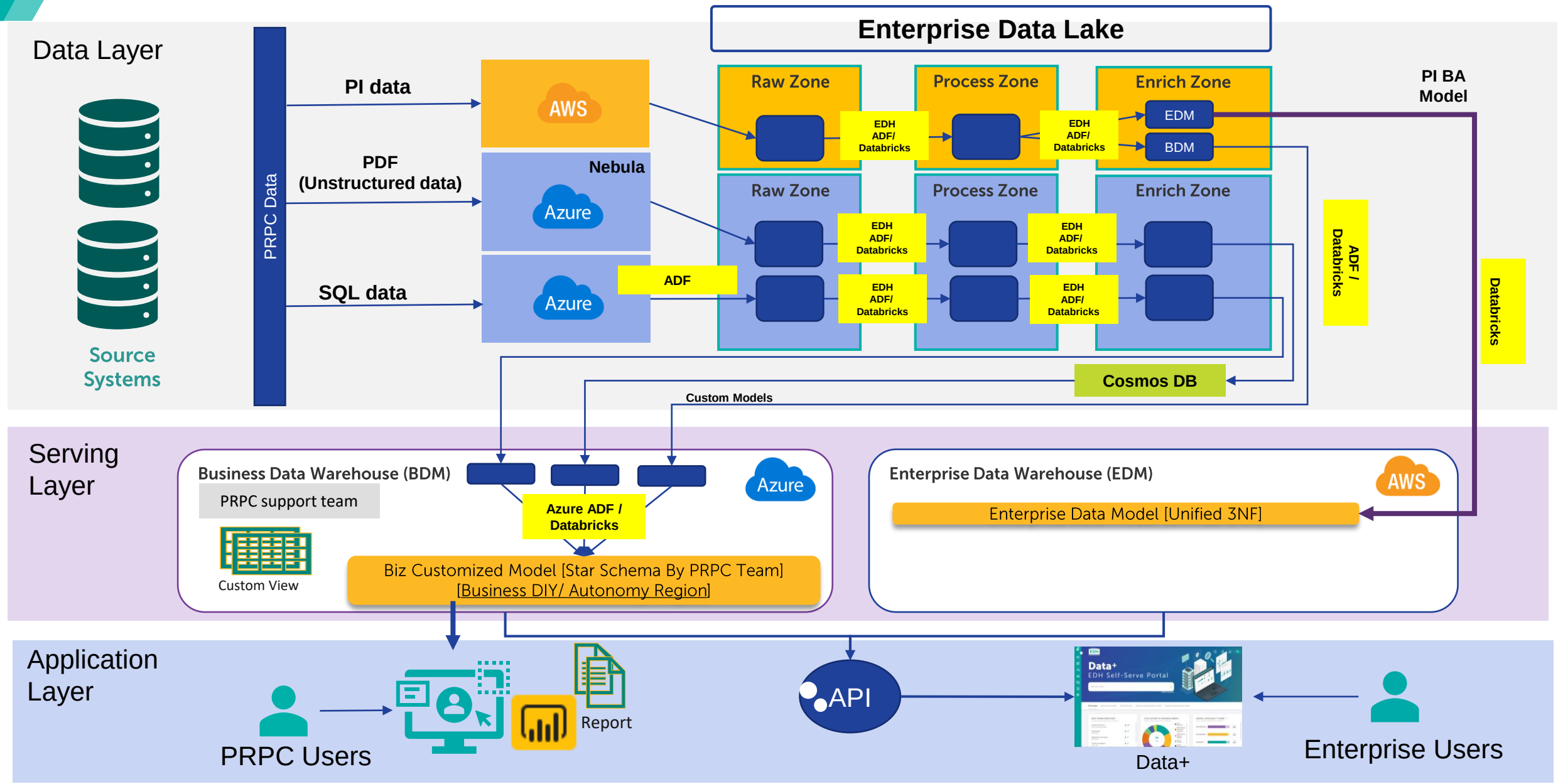
Business Driver:

Source of IOW inputs are scattered and not unified under a single system and platform. Thus, the objective of this project is to create a consolidated IOW data and reporting inputs into a business data warehouse in Enterprise Data Hub (EDH) which will enforce proper data management role and practices as guided by section 5.5 and 6.7 of PETRONAS Group Management Framework (PGMF). Then, the data quality will be measured to provide the confidence level of data consumption by IOW Dashboard.

Product Vision:

The goal is to enable a unified platform for Facilities Integrity (FI) staff to monitor IOW process parameters and deviation which are captured from various structured and unstructured data sources, enrich the data with extracted features and create visibility and alert mechanism which allow FI to take active measures as guided by Corrosion Management and Mitigation Program (CMMP).

Overview of Data Architecture



Key Outcome 1: Data Dictionary

Data Discovery at IOW source systems is the first step to be taken to collect and populate information in Data Dictionary for further analysis

Extract data attributes from IOW source systems → Populate Technical and Business Metadata → Identify Critical Data Element, Master and Reference Data, Data Quality Rules → Populate these information in Data Dictionary Tools

Technical Metadata:
Provides information on the format and structure of the data as needed by computer systems

Examples of technical metadata:
- data source/database tables
- foreign/primary keys
- data models
- data types/lengths
- etc

Business Metadata:
Provides meaning of data, by defining terms in everyday language without regard to technical implementation

Examples of business metadata:
- business data types
- business description
- ownership/domain
- data classification
- etc

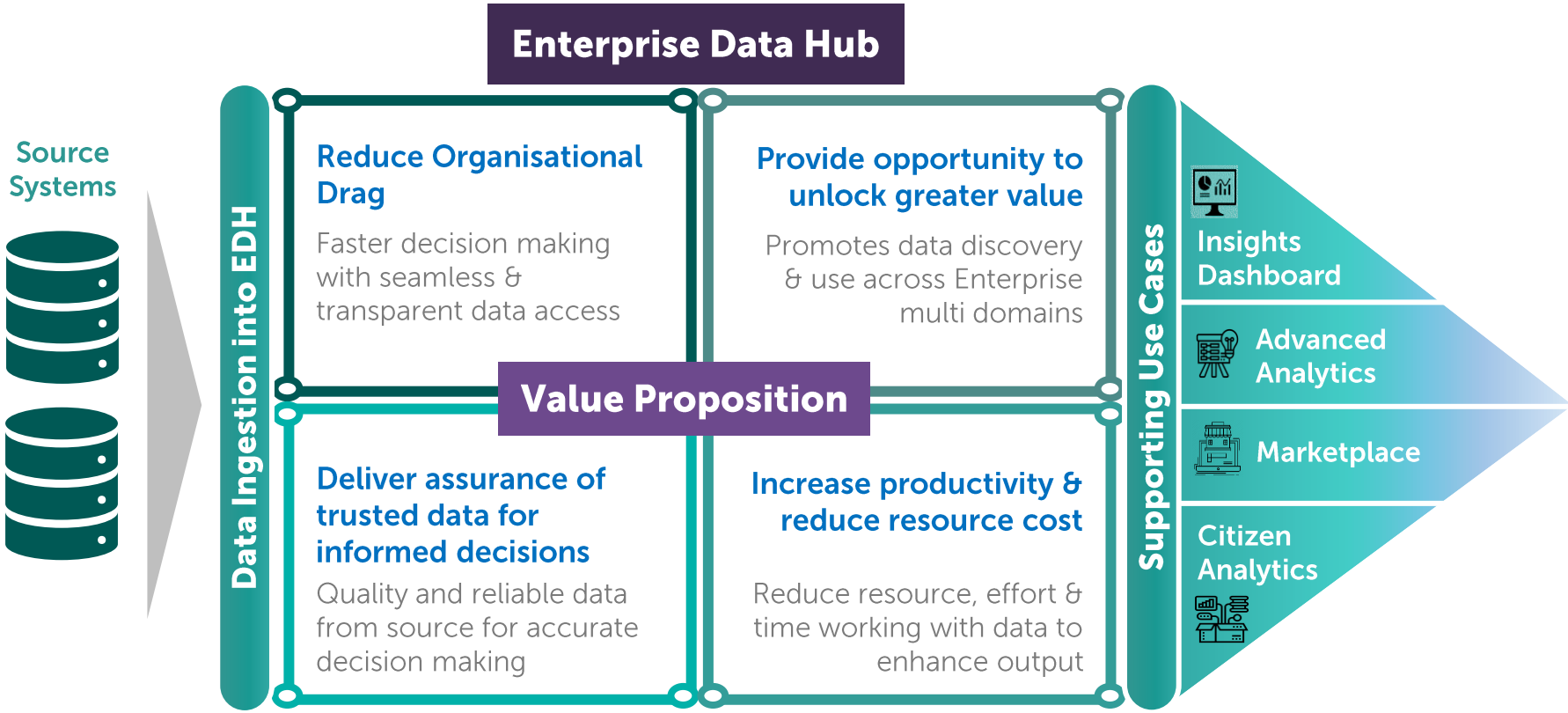
TECHNICAL METADATA												
NO.	DATA SOURCE	MASTER DATA OR REFERENCE DATA OR TRANSACTIONAL DATA	DATABASE TABLE/API NAME	TABLE/API DESCRIPTION	DATABASE FIELD NAME	FIELD DESCRIPTION	SCREEN NAME	SAMPLE DATA	PRIMARY KEY	FOREIGN KEY	DATA TYPE	DATA LENGTH
1	Hawk-Ai API (Amplus India)	Transactional Data	from_to_plant_active_power	Actual Daily Active Power (every 5 mins) per plant	timestamp	Time of generated active power	Plant active power	2021-03-17T08:05:00Z	FALSE	FALSE	DATETIME	30
2	Hawk-Ai API (Amplus India)	Transactional Data	from_to_plant_active_power	Actual Daily Active Power (every 5 mins) per plant	value	Am... acti... eve...						
3	Hawk-Ai API (Amplus India)	Transactional Data	from_to_plant_active_power	Actual Daily Active Power (every 5 mins) per plant	plant_id	Ref... info...						
4	Hawk-Ai API (Amplus India)	Transactional Data	from_to_plant_active_power	Actual Daily Active Power (every 5 mins) per plant	parameter	Par... info...						
5	Hawk-Ai API (Amplus India)	Transactional Data	plant_expected_generation_daywise	Expected Daily Power Generation per plant	date	Dat... dail...						
6	Hawk-Ai API (Amplus India)	Transactional Data	plant_expected_generation_daywise	Expected Daily Power Generation per plant	plant_id	Ref... info...						
7	Hawk-Ai API (Amplus India)	Transactional Data	plant_expected_generation_daywise	Expected Daily Power Generation per plant	parameter	Par... info...						
8	Hawk-Ai API (Amplus India)	Transactional Data	plant_expected_generation_daywise	Expected Daily Power Generation per plant	value	Am... dail...						
9	Hawk-Ai API (Amplus India)	Transactional Data	day_plant_generation	Actual Daily Power Generation per plant	plant_id	Ref... info...						
10	Hawk-Ai API (Amplus India)	Transactional Data	day_plant_generation	Actual Daily Power Generation per plant	parameter	Par... info...						
11	Hawk-Ai API (Amplus India)	Trans...	day_plant_generation	Actual Daily Power	date	Dat...						
12	Hawk-Ai API (Amplus India)	Trans...										

BUSINESS METADATA				
BUSINESS DATA TYPE	BUSINESS DESCRIPTION / GLOSSARY	DATA CLASSIFICATION	DATA DOMAIN	PERSONAL DATA
NE Energy Production	Power Generation by AMPLUS	Confidential	New Energy	
NE Energy Production	Power Generation by AMPLUS	Confidential	New Energy	
NE Energy Plant Details	Power Generation by AMPLUS	Confidential	New Energy	
NE Energy Production	Power Generation by AMPLUS	Confidential	New Energy	
NE Energy Production	Power Generation by AMPLUS	Confidential	New Energy	
NE Energy Plant Details	Power Generation by AMPLUS	Confidential	New Energy	
NE Energy Production	Power Generation by AMPLUS	Confidential	New Energy	
NE Energy Production	Power Generation by AMPLUS	Confidential	New Energy	

Data Dictionary will be the input for the following:
- Data Quality
- Master Data
- Data Enablement in EDH for Analytics

Key Outcome 2: Data Liberation via EDH

will allow PRPC and other PETRONAS units to operate in an "eyes on, hands off" mode via a single source of truth data platform for Analytics



FULL DATA LIBERATION

For Sustained Data Monetisation

- Empowered and informed decision making with agility
- Drive and sustain business performance and operational efficiency
- Unleash new growth opportunities through innovation

EDH Data Enablement Process by Enterprise Data

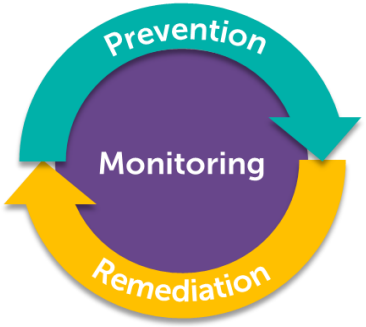
Data Discovery at Source	Data Model Development	Data Pipeline Build from Source System to EDH	Data Mart in Business Data Warehouse	Data Serving to Users for Analytics via IOW Dashboard and Data+

Key Outcome 3: Data Quality at Source

Data Quality at IOW Source Systems to be achieved by preventing input of bad data, remediating data to adhere to data standards & quality rules and monitoring the data health

PETRONAS DATA QUALITY
A characteristic of a data that associated with the planning, implementation, and control of activities that apply quality management techniques to measure data health, address data issues to assure it is fit for consumption and meet the needs of data consumers

Achieve via



1. PREVENTION – Prevent & guard PETRONAS systems & applications from bad data
2. MONITORING - Monitor the state of PETRONAS data health
3. REMEDIATION - Remediate data in the event of any data does not meet data standard and quality acceptance levels

To be done by

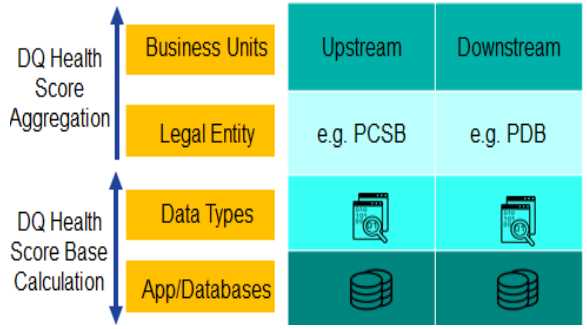
Data Discovery at Source Systems

- Permasense
- GE APM
- 2 PI servers
- Unstructured data

1 Define data quality rules, implement in source system and measure via DQ Tool

2 Establish and operationalize data standard

3 Monitor the data quality through DQ Dashboard

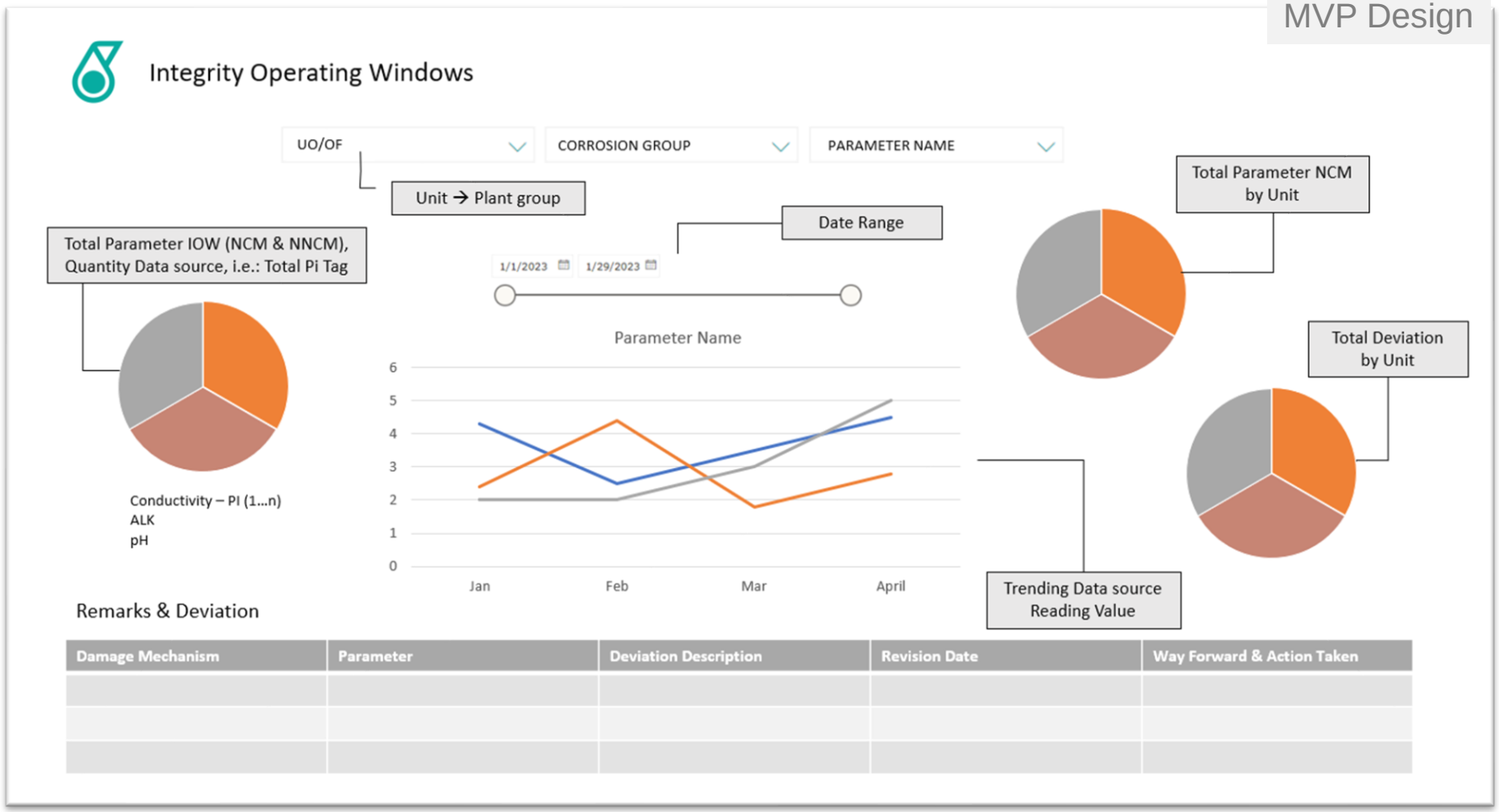


4 Prevent & remediate data to adhere to data standard and meet minimum 90% acceptance level within 2 years

Key Outcome 4: Data Serving via IOW Dashboard

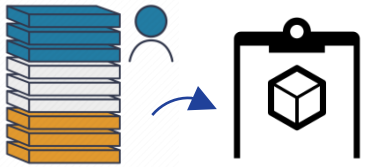
Drive and sustain business performance and operational efficiency

MVP Design



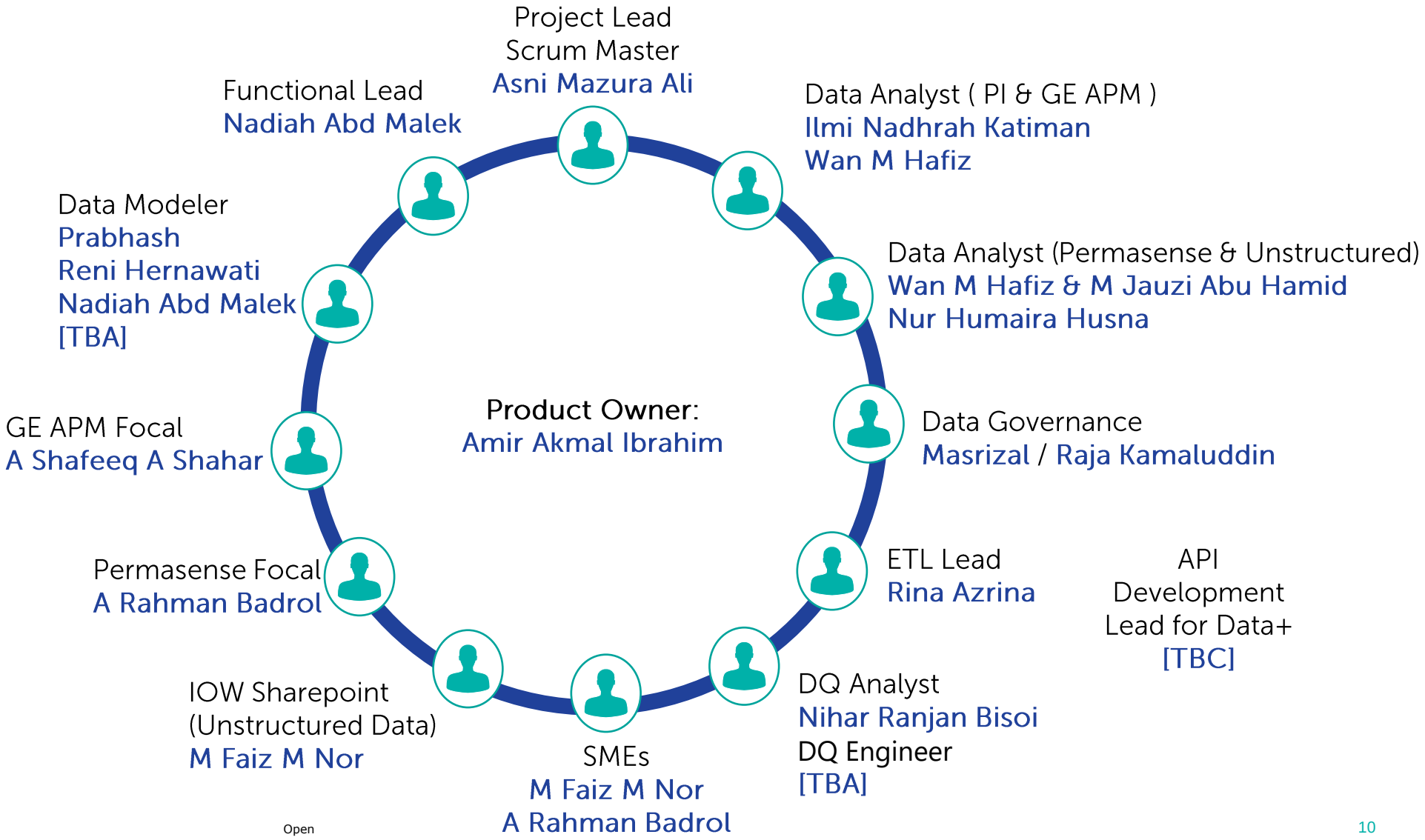
Product Features:

1. Online monitoring
2. Alert via email notifications on deviation



Product Backlog should be created based on the agreed scope and Key Outcomes (deliverables)

Project Team Structure



Open

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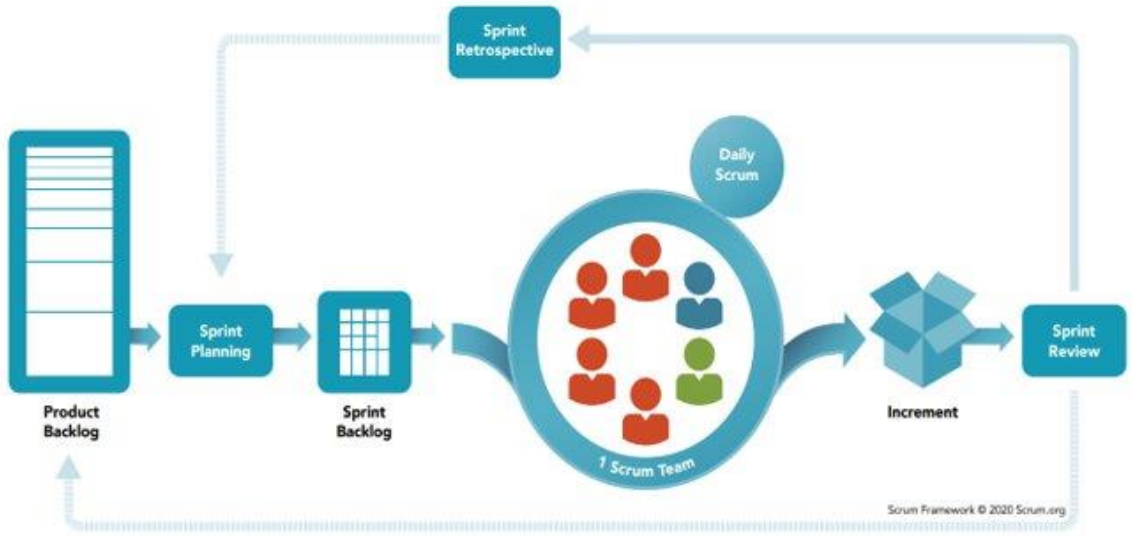
Internal

Delivery Approach

The team will undertake an iterative development approach (Scrum framework) that is based on estimated duration, and scope based on 4 key outcomes as part of the agreed deliverables in this project.

The key tenets are as follows:

- Joint ownership of decisions on the product backlog.
- Short and timeboxed implementation units (sprints).
- Prioritization of business objectives in a product backlog.
- Emphasis on value and on the remaining work.
- Self-organised and self-contained delivery team
- Sprints that produce progressive outcome.
- Sprint demonstrations and have regular checkpoints.
- Regular retrospective meetings that provide valuable insights to delivery team for improving their functioning.



1 sprint = 3 weeks
Daily scrum: Tue, Wed, Thu
Sprint Planning: Monday (6 hours)
Sprint Review: Friday (1 hour)

Scrum environment: Azure DevOps
PRPC ODS-EDH-Analytics Projects

Business Engagement: Expectations & Value Unlock via EDH

Product Owner

Representative of the business and product authority. Promptly clarifies requirements and helps prioritize the product backlog.

Project Manager /Scrum

Responsible to ensure the success outcome of the solutions delivery.

SME

Bring deep business and domain knowledge and expertise.

Data Engineer & Data Analyst

Sources, cleans, transforms and produces data sets from internal and external data sources.

Development Team

Designs, implement, and maintain Platform environments, tools & technology solutions to meet business, technical and user requirements.

Value to PETRONAS

- Insights Dashboard
- Data Marketplace
- Analytics Marketplace
- Citizen Analytics

Data standardization
- Cross check with Master Data
- Compliance to 7 special data categories under legal and regulatory requirements.
- Bad data is identified, cleaned and goes through data standardization process.

Data quality
- Consistent quality Master Data and Reference Data by monitoring & governance
- Controlled change where maintenance done at source

Curated data catalog
- Standardize the data definition by documenting data at Curated Zone for Biz Data Warehouse

Integrated data ecosystem & stewardship
- Integration with source, data extraction capability by cognitive services in cloud
- Identified data owner and data steward for master data;

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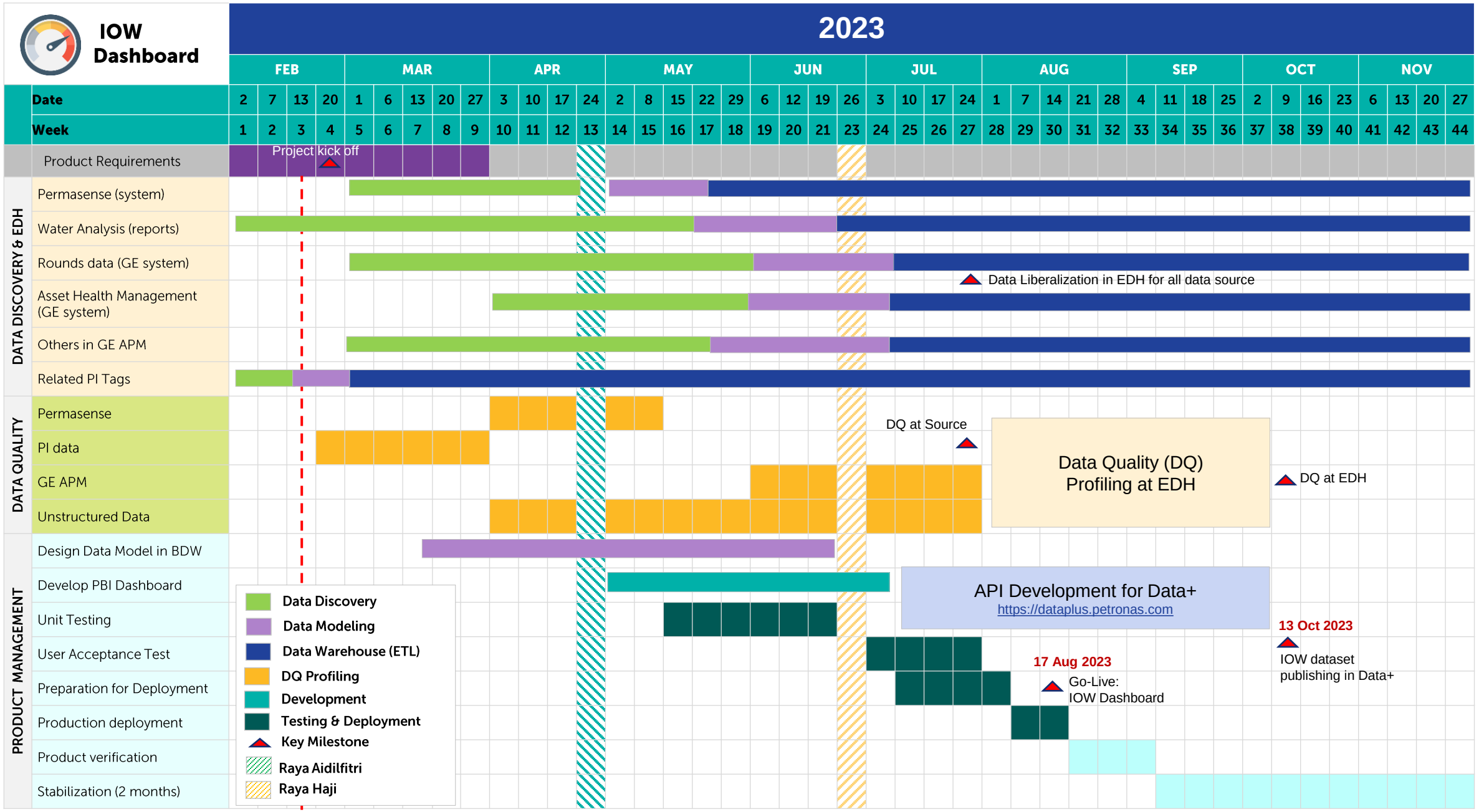
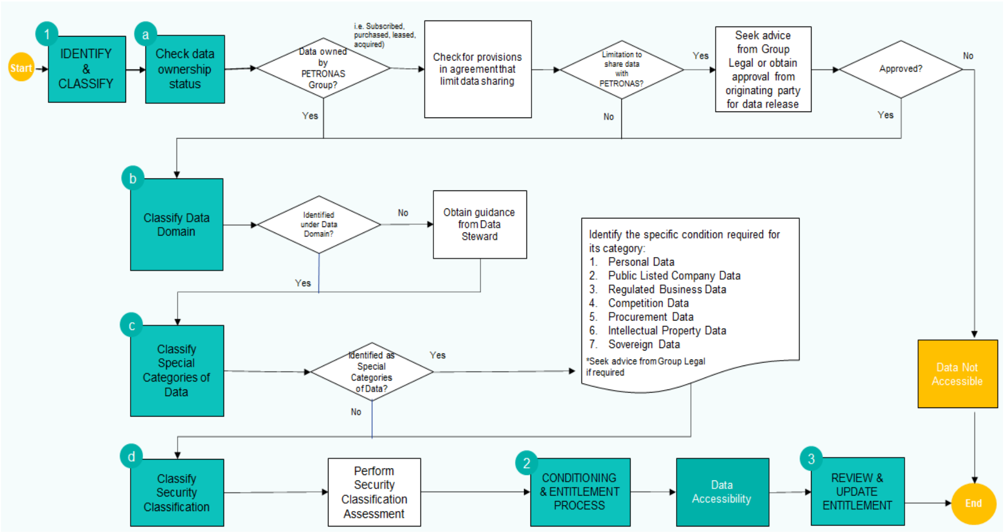
Overall Sequence of Project Activities

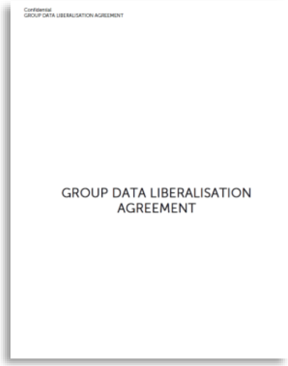
Estimated 11 sprints

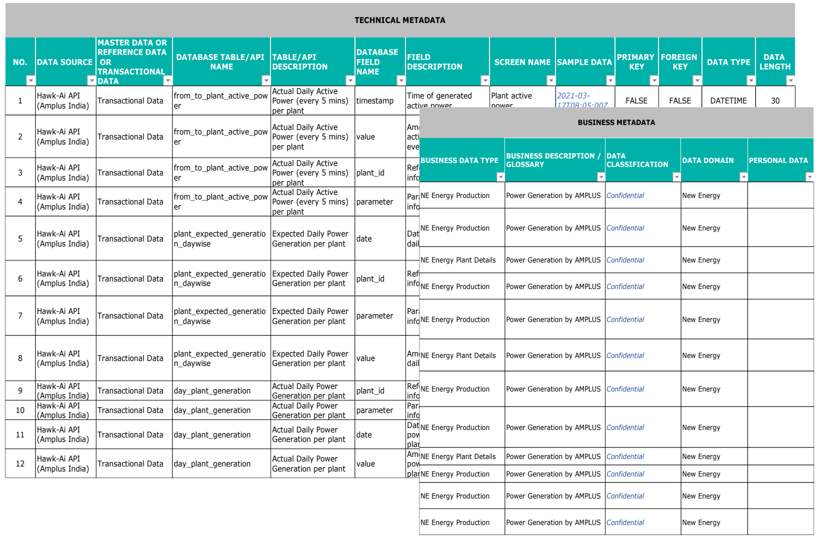


The Key Outcomes benefits both PRPC and PETRONAS users

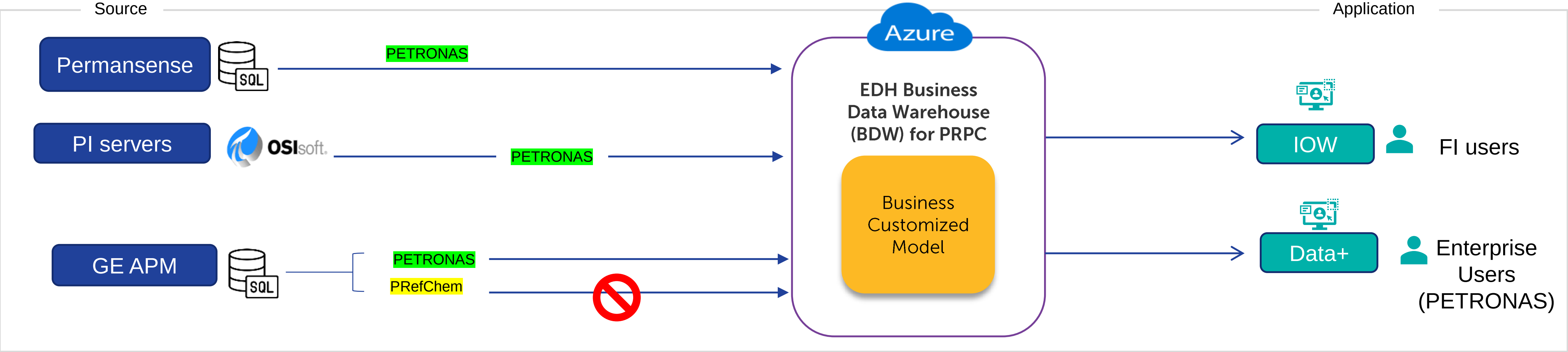
Data Governance







Data Requirement



Other project items

Key Success Factors

1. Timely business inputs & responses.
2. Sufficient allocation of users' availability for the project.
3. Strong collaboration between the business and project team.
4. All key functional requirements are consolidated and accurately validated by business.
5. All key cross-functional and technical integration requirements are consolidated and validated by respective functions.
6. Well-defined roles and responsibilities.
7. Support and buy-in from business leaderships.

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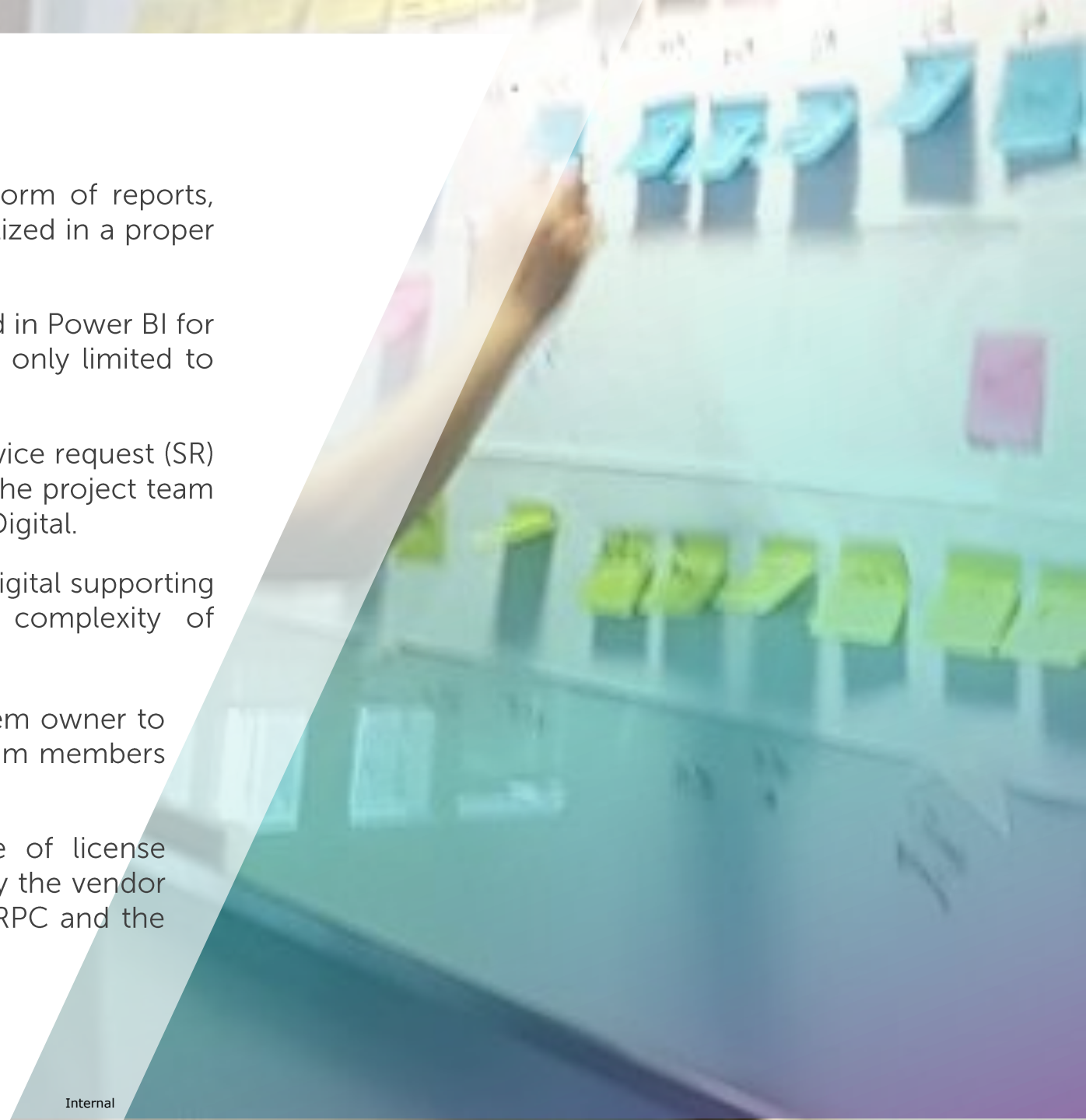
Key Assumptions

- Fragmented data and knowledge repositories in the form of reports, images, documents (unstructured data) must be centralized in a proper content management system; e.g. Sharepoint Online.
- The product release (MVP) by this project is a dashboard in Power BI for end users in FI / PRPC UF. Further product increment only limited to PowerBI and add-ons available for free.
- This project is not under the subject of any specific service request (SR) and SOW between PRPC and Group Digital/PDSB; yet the project team shall apply the project management practices in Group Digital.
- The project is utilizing existing resources from Group Digital supporting PRPC and EDH. Additional resources to support complexity of development work shall require initiation of SR to GD.
- Data source systems are under the control of the system owner to ensure access to the data is provided to the project team members for analysis and pipeline connection.
- Custodian/Owner of data source systems are aware of license agreement /proprietary or intellectual property rights by the vendor if they are explicitly written in the contract between PRPC and the vendor companies.



Out of Scope

- EDH serves as a platform as a service (PaaS) for data analytics; not for transactional purposes.
- EDH do not support business workflow. Any digital application is built outside of EDH.
- Complex software designs and development is not in scope due to absence of SR budget. Hence, the project team to leverage the capacity of existing resource capability only to maximize value of scrum team.
- Product licenses and subscriptions of data source systems
- Data Migration
- Process re-engineering
- Organizational change management
- Warranty/Production Support

Potential Risk & Mitigation Plans

Potential Risk	Impact	Mitigation Plan
Low business users' availability	Project key activities not completed on time; possible timeline delayed	Adopt scrum meetings Invitations to be sent out at least a week earlier
Requirements not clearly defined	Solution not able to address business pain point; costly workaround	Low hanging fruit strategy and prioritization of backlog to ensure minimal solution delivered to the business.
Change of requirements	Project timeline delayed	Change requirements is put in the product backlog and should be discussed with scrum project if it is highly prioritized and plan on how to minimize the disruption to the ongoing progress.
Source system not ready with the data	Impede the progress of data dictionary completion in the project.	Escalate to PRPC Digital for resolution.
Source system is not within Cyber Security monitoring	Potential data leakage due to vulnerability of the system	Escalate to PRPC Digital to initiate attention from Cyber Security to do assessment.

Thank you for your passion!