Project AEDES Enhancement

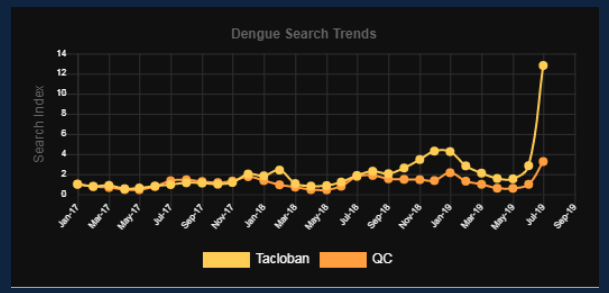
CirroLytix Research Services

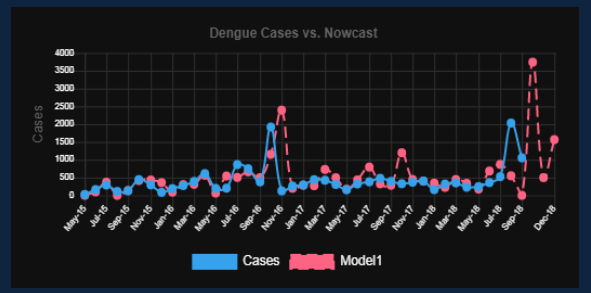
October 2021

Agenda

- Current state and use-cases
- Feedback on prototype
- Areas of enhancement
- Team composition

Project AEDES Front-end





Use-case	Dengue Panic Alerts	Dengue Case Nowcasting	Dengue Hotspot Detection
Visualization API	Chart JS		Mapbox API
Front-end Stack	Web Front-end		
Back-end Stack	AJAX / PHP		
Datasets	Google Search Trends	PAGASA Precipitation	PAGASA Temperature
	DOH Epi Bureau Cases and Deaths	Sentinel FAPAR	Sentinel NDVI
	Sentinel NDWI		

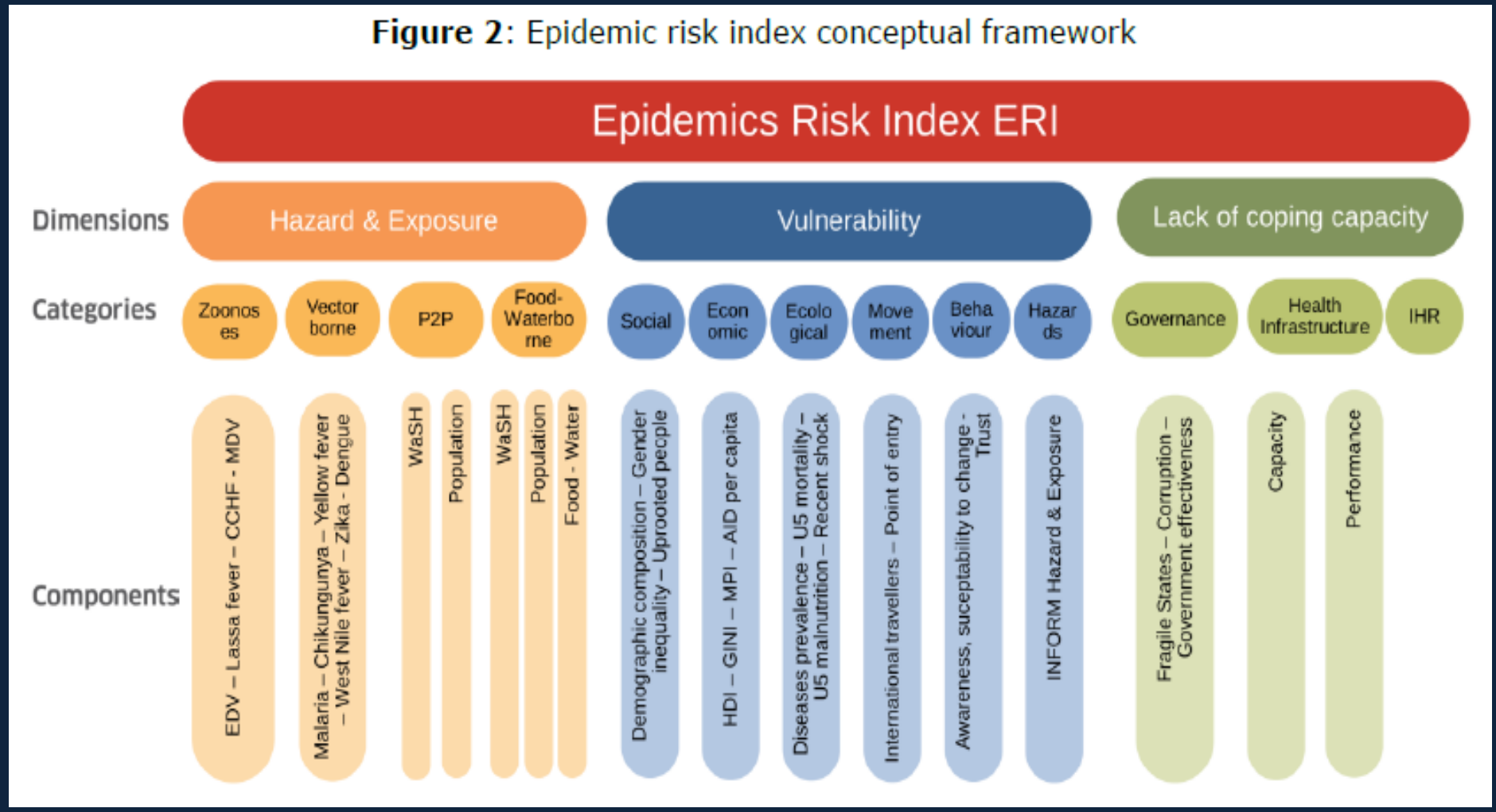
Prototype Feedback and Challenges

- Current data not available
- Data gathering and preparation is manual
- Dashboard is counter-intuitive, needs elaboration
- Policy usage of the information is unclear
- Scope of solution is too narrow (dengue), needs relevance

Areas of Enhancement

- Risk-based Framework
- Improved Insight generation
- Data gathering Automation
- Interface Improvement
- Expansion of use-cases
- LGU Engagement

INFORM Risk Framework



INFORM was developed by the EU JRC.

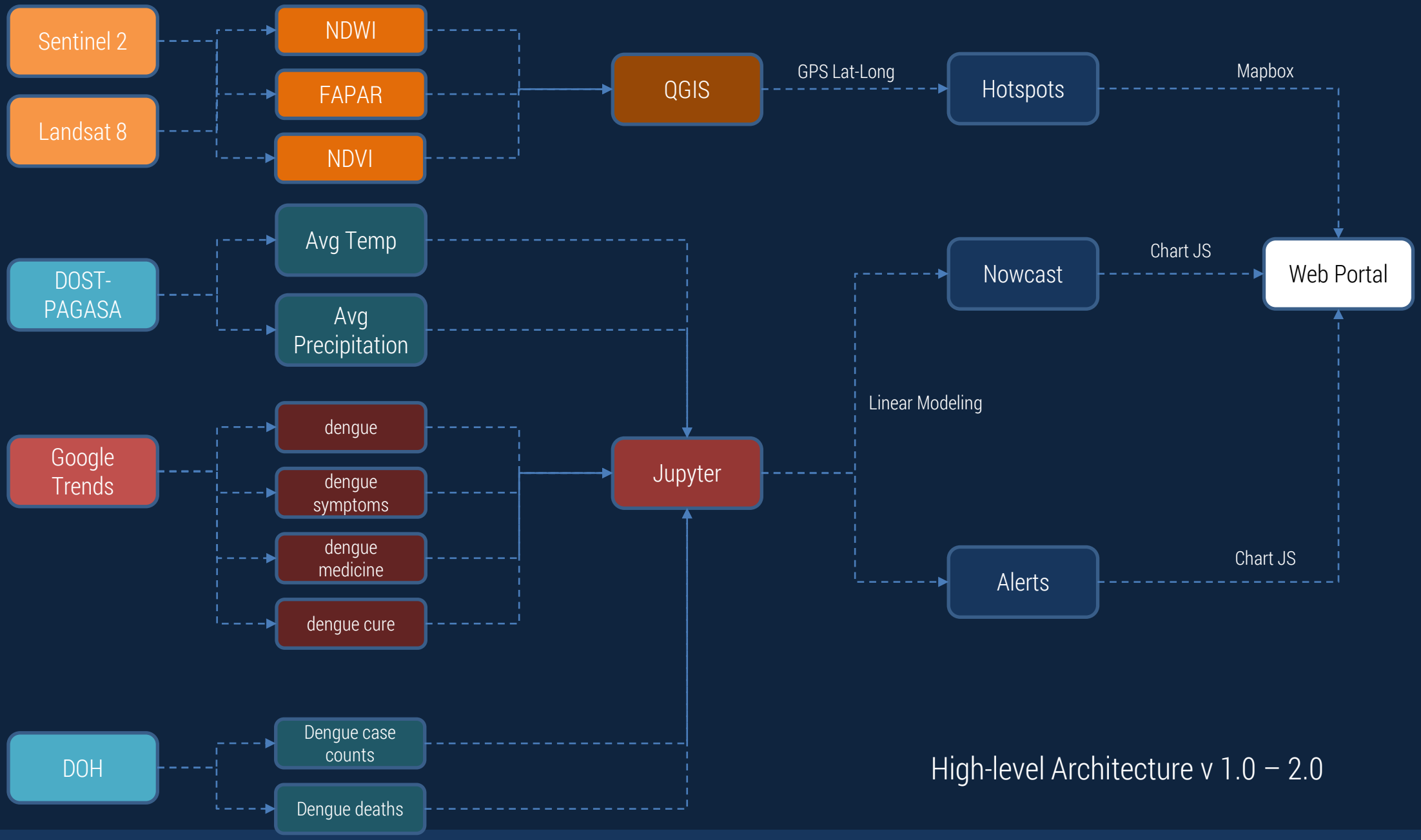
Risk framework provides data-driven policy ideas and actionable strategies.

INFORM AEDES Data (Proposed)

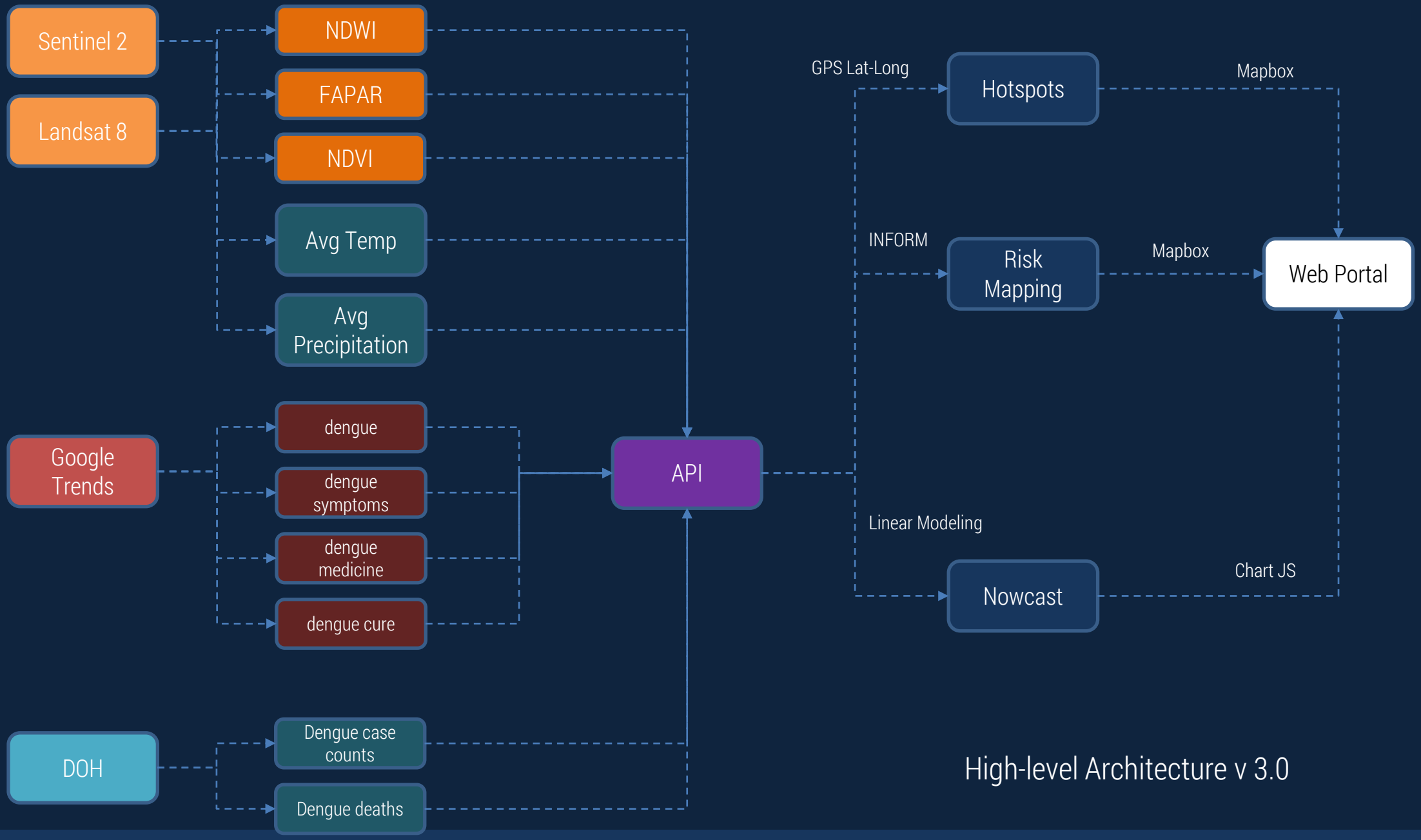
Hazards	Vulnerabilities	Coping Capacity
Dengue Case incidence Flood Occurrence Temperature Precipitation COVID-19 Incidence Access to water Access to sanitation	Population ages 0-20 Poverty Index Population affected by natural disasters Population previously infected by dengue Mortality Land-use types Social listening Primary and secondary schools Philhealth coverage Human mobility	Presence of health centers Presence of hospitals Number of health workers Health expenditure Vaccination coverage

Risk-based Decision Use-cases

- Hazards – monitor progress of epidemic, generate alerts
- Vulnerabilities – prioritize areas with vulnerable groups, suggest demographic and geographic determinants of risk
- Coping Capacity – prioritize areas for emergency aid, recommend infrastructure investment



High-level Architecture v 1.0 – 2.0



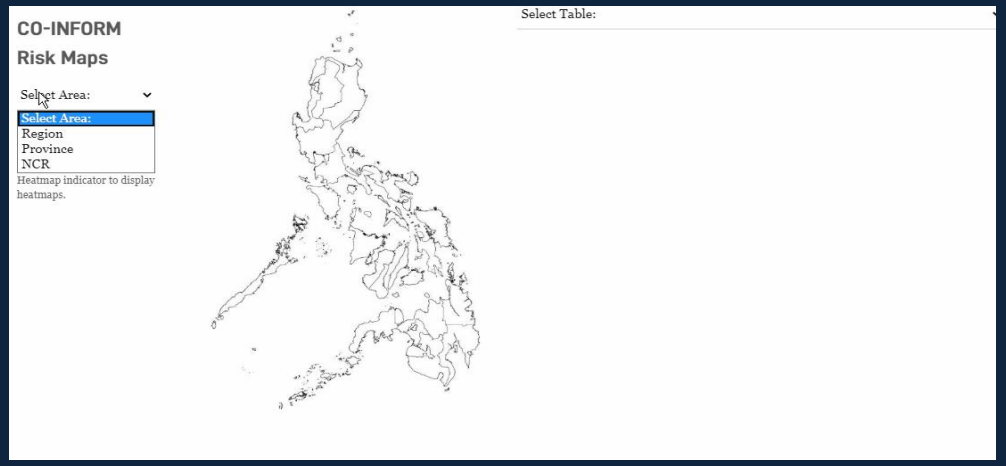
High-level Architecture v 3.0

Expanded Satellite Indicators

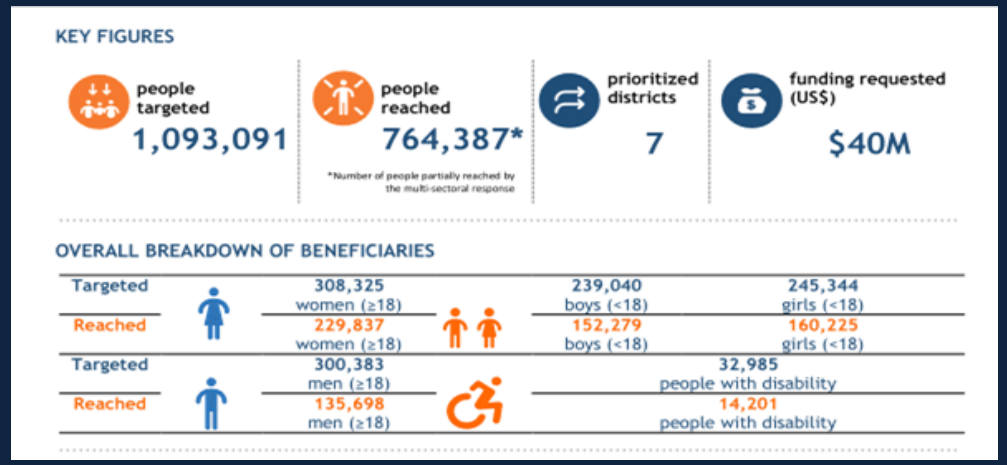
Surface Conditions	Air Quality	Climate and Hazards
FAPAR	PM2.5	Temperature
NDWI	NO2	Rainfall
NDVI	SO2	Earthquake Zone
NDBI	CO2	Flooding Zone

Interface Improvement

Current Dashboard



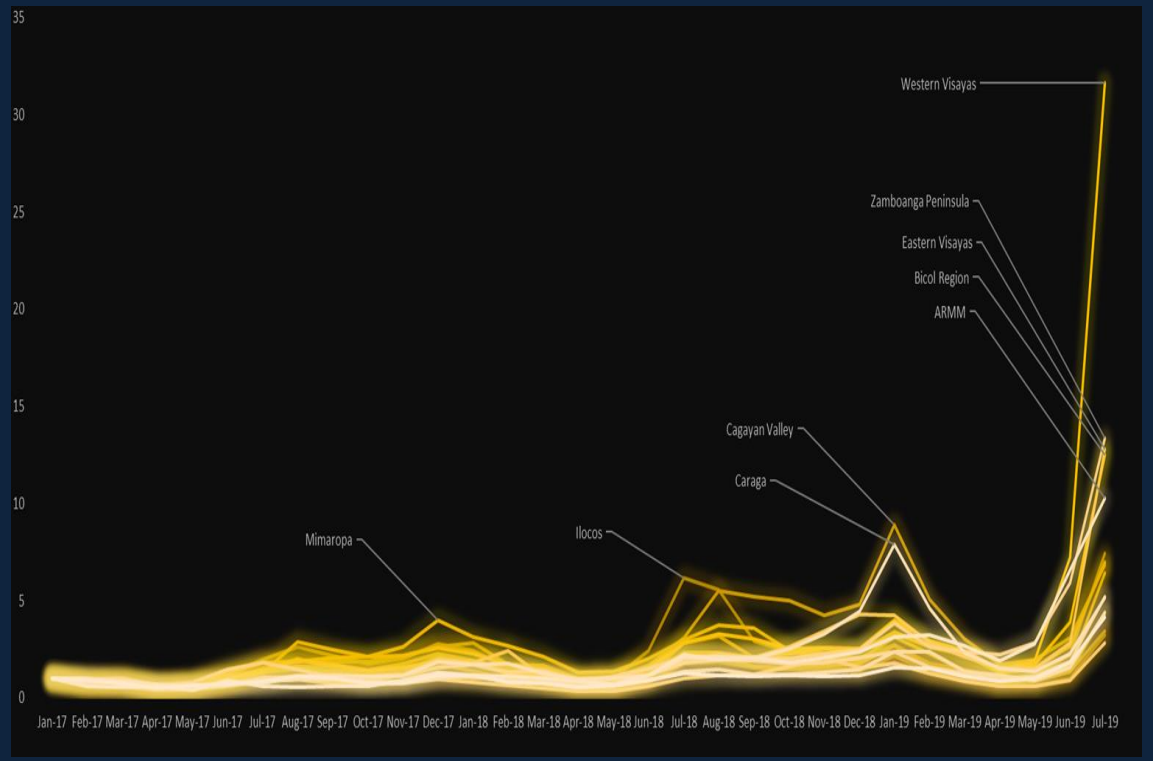
INFORM Risk Mapping



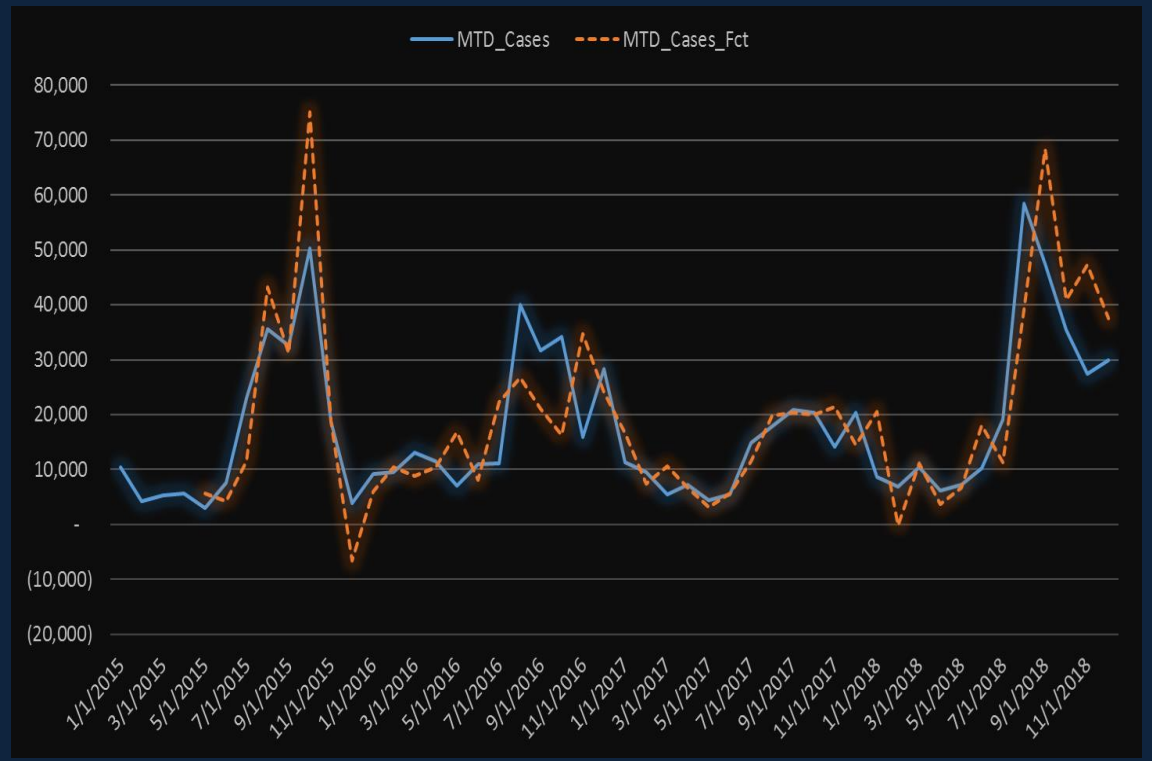
Sit-rep and Alerts

Epidemic Indicators

Digital Syndromic Surveillance

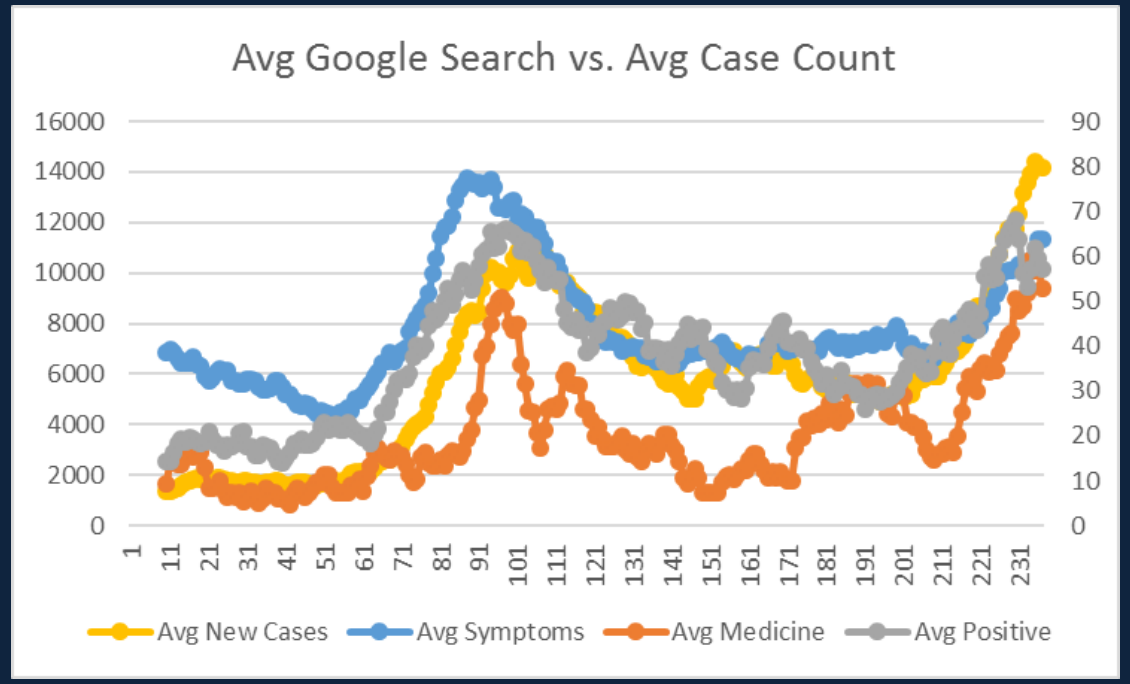


Google Dengue-related Searches

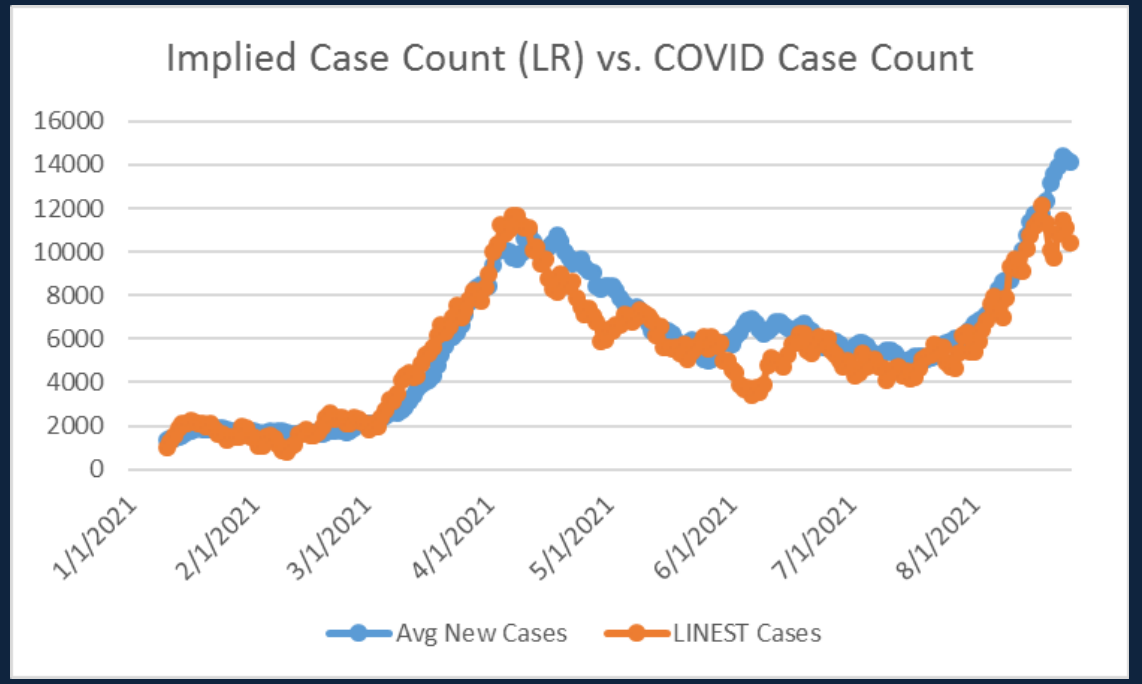


Dengue cases and Nowcast

Digital Syndromic Surveillance



Correlation of COVID-related Google Searches and COVID cases



Implied COVID cases nowcasted by Google Trends

Expanded Disease Use-cases

Vector Borne	Airborne	Bacterial, Food and Water-borne	Zoonotic
Dengue Malaria Chikunggunya Zika	COVID-19 TB Respiratory	Cholera Tetanus	Rabies Leptospirosis

Consultants

Emily Vizmonte

Project Manager and
Tech Lead

Mark Pascual

Cloud and
Data Engineer

Xavier Puspus

Machine Learning
API Management

Researchers/Interns

Data gathering and research

Execution Plan

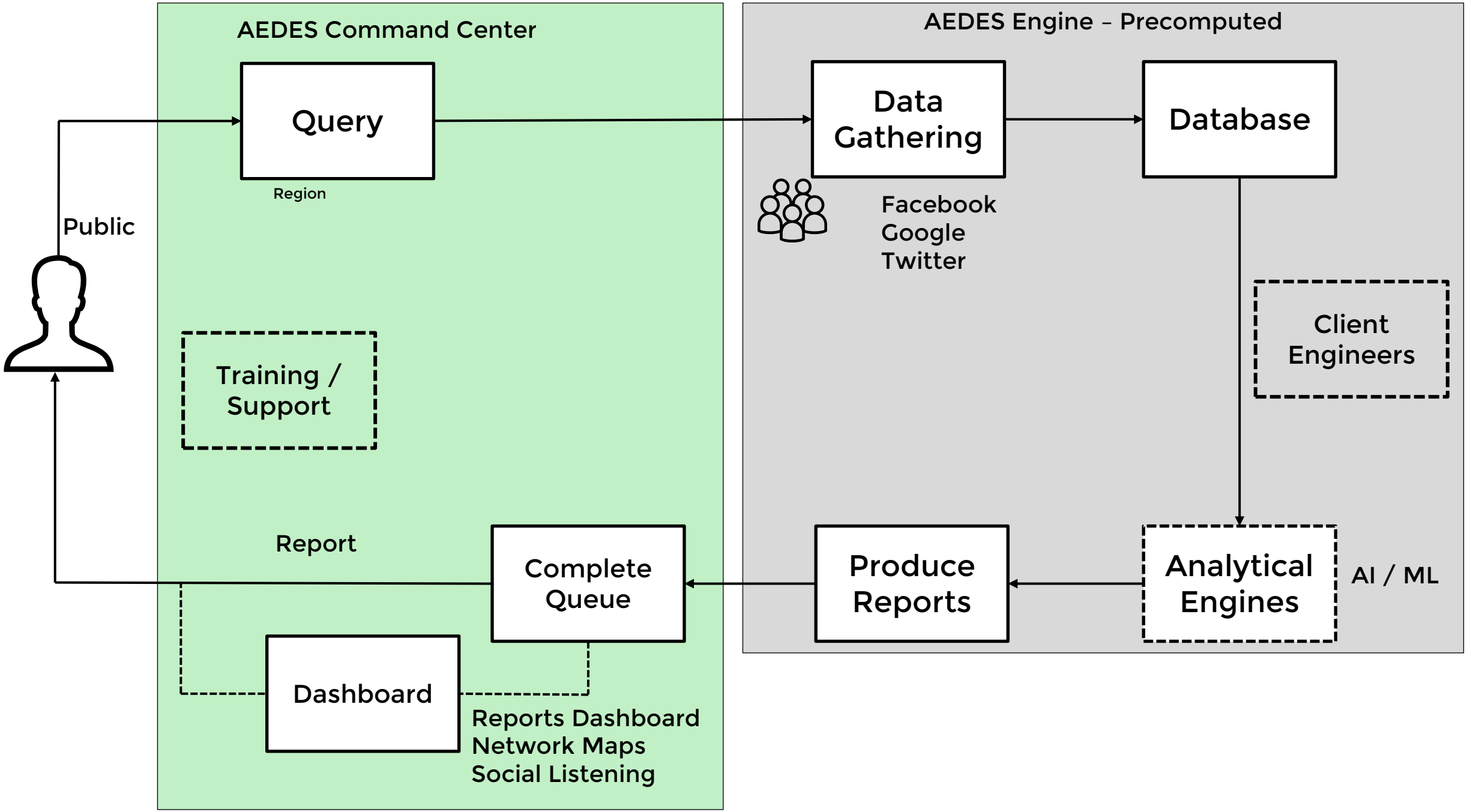
Activity	M1	M2	M3	M4	M+
Proposal Submission					
Project Plan Report					
Development Environment Setup and Solution Design					
Open-Source Regional Search Trends and Satellite Data Collection					
Data Management and Data Preparation					
Risk INFORM Model Integration					
Data Analysis: Time-Series Trends					
Data Analysis Social Listening Trends					
Dengue Regional Risk Mapping					
Mid-Term Monitoring and Evaluation Report					
UI/UX Mockups/Wireframes					
Application Development (Data Visualization and Dashboard)					
Testing and Deployment					
Local Health Unit/s (at least 3) Dashboard Training					
Final Monitoring and Evaluation Report					
Post-Implementation: Publication and Community Engagement					

Outputs

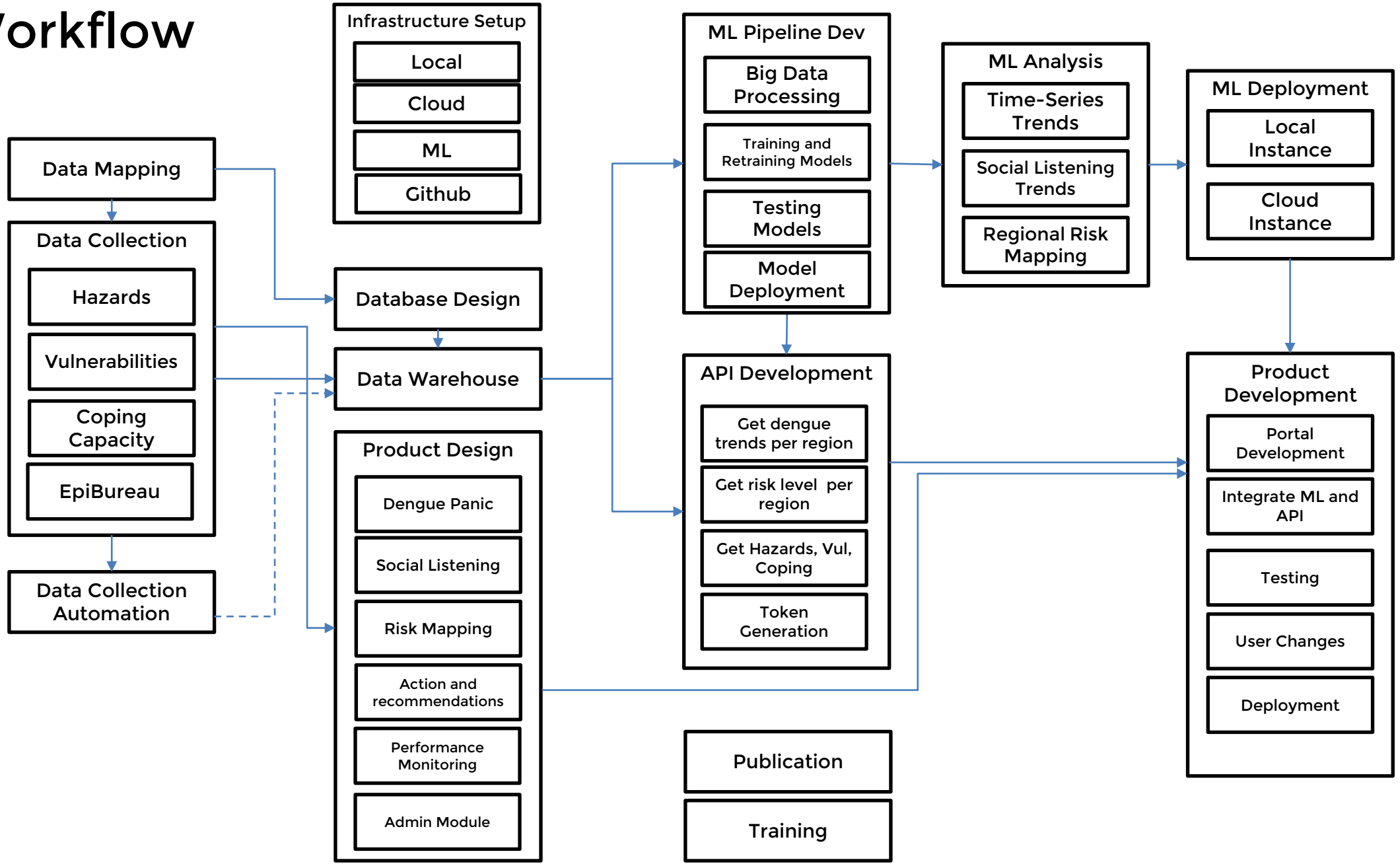
Type	Output
Product	Project AEDES - Social Trends, Dengue Trends, Dengue Risk Indices and Mapping (1)
Publications	Research Paper (2)
Publications	Policy Paper (1)
People Services	Training for Researchers and Health Units (3)
Partnerships	LGUs (2)

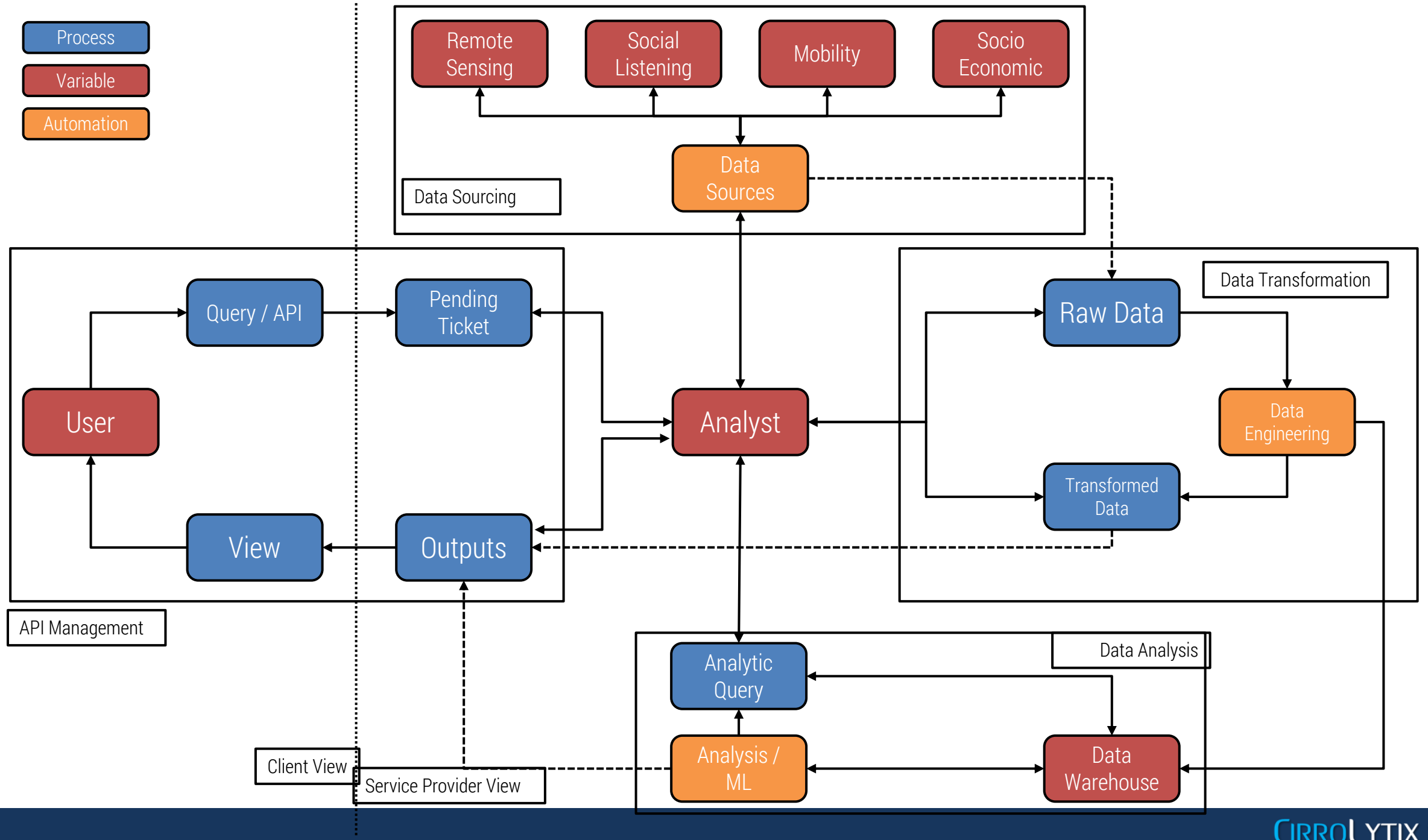
Statement of Work

Dates	Milestone
Jan 3rd Week	Inception Report 1) Workplan 2) Report on the proposed environment set up 3) Review of open-source regional search trends 4) Data management and data preparation 5) Assessment of Project AeDES
Mar 4th Week	Midterm Report 1)Reports on the following: - Risk Inform model integration - Data analysis time series/social listening risk mapping - Dengue Risk mapping 2) UI/UX mockups 3) Update on application development
April 2nd Week (no cost extension until May)	Final Report 1) Complete application development based on approved project plan 2) Testing results 3) Deployment report 4) Training materials 5) Pilot report 6) Training report


AEDES Command Center
AEDES Engine – Precomputed
Query
Region
Public
Data Gathering
Database
Facebook
Google
Twitter
Client Engineers
Training / Support
Report
Complete Queue
Produce Reports
Analytical Engines
AI / ML
Dashboard
Reports Dashboard
Network Maps
Social Listening

Workflow


Infrastructure Setup
Local
Cloud
ML
Github
ML Pipeline Dev
Big Data Processing
Training and Retraining Models
Testing Models
Model Deployment
ML Analysis
Time-Series Trends
Social Listening Trends
Regional Risk Mapping
ML Deployment
Local Instance
Cloud Instance
Data Mapping
Data Collection
Hazards
Vulnerabilities
Coping Capacity
EpiBureau
Data Collection Automation
Database Design
Data Warehouse
Product Design
Dengue Panic
Social Listening
Risk Mapping
Action and recommendations
Performance Monitoring
Admin Module
API Development
Get dengue trends per region
Get risk level per region
Get Hazards, Vul, Coping
Token Generation
Product Development
Portal Development
Integrate ML and API
Testing
User Changes
Deployment
Publication
Training


Process
Variable
Automation
Remote Sensing
Social Listening
Mobility
Socio Economic
Data Sources
Data Sourcing
Data Transformation
Raw Data
Query / API
Pending Ticket
User
Analyst
Data Engineering
Transformed Data
View
Outputs
API Management
Data Analysis
Analytic Query
Analysis / ML
Data Warehouse
Client View
Service Provider View

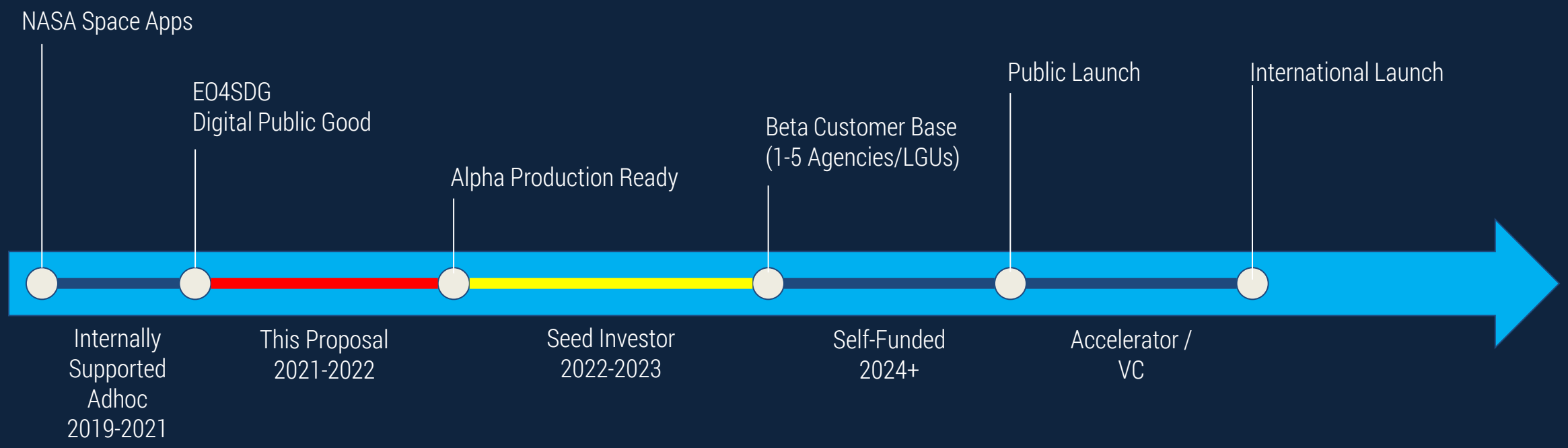
Sustainability Plan

- Kick start LGU Engagement
- Lean Canvas - Cost and Fee Structure, establish “Business” Model
- Establish investment runway before self-funding status

LGU Engagement

LGU Coverage	Current Status
San Fernando, Pampanga	Inactive MOU – via PSPHP, need to revisit
CALABARZON	Existing engagement with DOST R4
Tacloban, Eastern Visayas	No relationship
Iloilo, Western Visayas	Initial linkage via DAP, Project SPARTA
Cotabato, BARMM	Initial linkage via TAF, UNDP, UNICEF Country Office

Development Roadmap (Internal)



Team Members

Dominic Ligot

Computational Social Science, Clinical Epidemiology

Mark Toledo

Big Data Engineering

Claire Tayco

Statistical Models, Machine Learning

Cricket Soong

Community Engagement, Emerging Technologies

Rache Melendres

Geospatial Modeling, Agricultural Bio-technology

Emily Jo Vizmonte

Risk Modeling

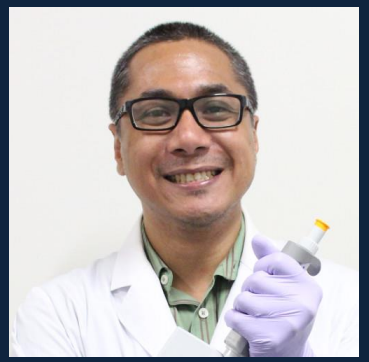
Mark Pascual

Web Engineering

Board of Advisers

Mike Promentilla

Chemical Engineering, Environmental Risk Mapping



Thaddeus Carvajal

Dengue and Mosquito Research

Wilson Chua

Big Data Analysis

Mike Domagas

NASA, ESA, Satellite Research

GLOBE Mosquito Project
Mosquito RealTime Census Project

Thank You

CirroLytix Research Services

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