

Project Resilience

A Platform to Inform and Help Tackle
Global Decision-Augmentation Problems

Project Summary

May 2023



Agenda

Project Mandate and History

Platform Outline

State of MVP

Architecture

Vision for Final Platform

Call for Help and Contribution

Contribution to Linux Foundation

Project Statement

Neutral Holding

- Global, not for profit
- Partnered with a UN agency, ITU

Open governance model

- Transparent and open governance model
- Instill trust in contributors and adopters in the design of the project and assets
- Neutral management of projects' assets by the foundation

Growing community opportunity

- Increase visibility of project through LF ecosystem
- Opportunities to collaborate with other hosted Climate projects

PROJECT RESILIENCE

A GLOBAL COLLABORATION
FOR AN OPEN AND PUBLICLY
AVAILABLE SERIES OF CLOUD
BASED AI PREDICTORS AND
PRESCRIPTION TOOLS



Project Resilience Goals



A platform to enable collaboration on building predictive and prescriptive models that can be used by any community



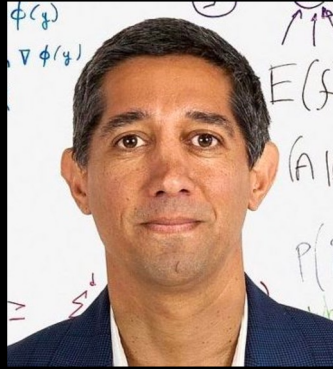
A platform to inform and help tackle global decision-augmentation problems.



Identifying data and guidelines to support sustainable models.



Focus on multi stakeholders and variety of users globally



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The Team



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Initial validation: Collaboratively Tackling the Pandemic



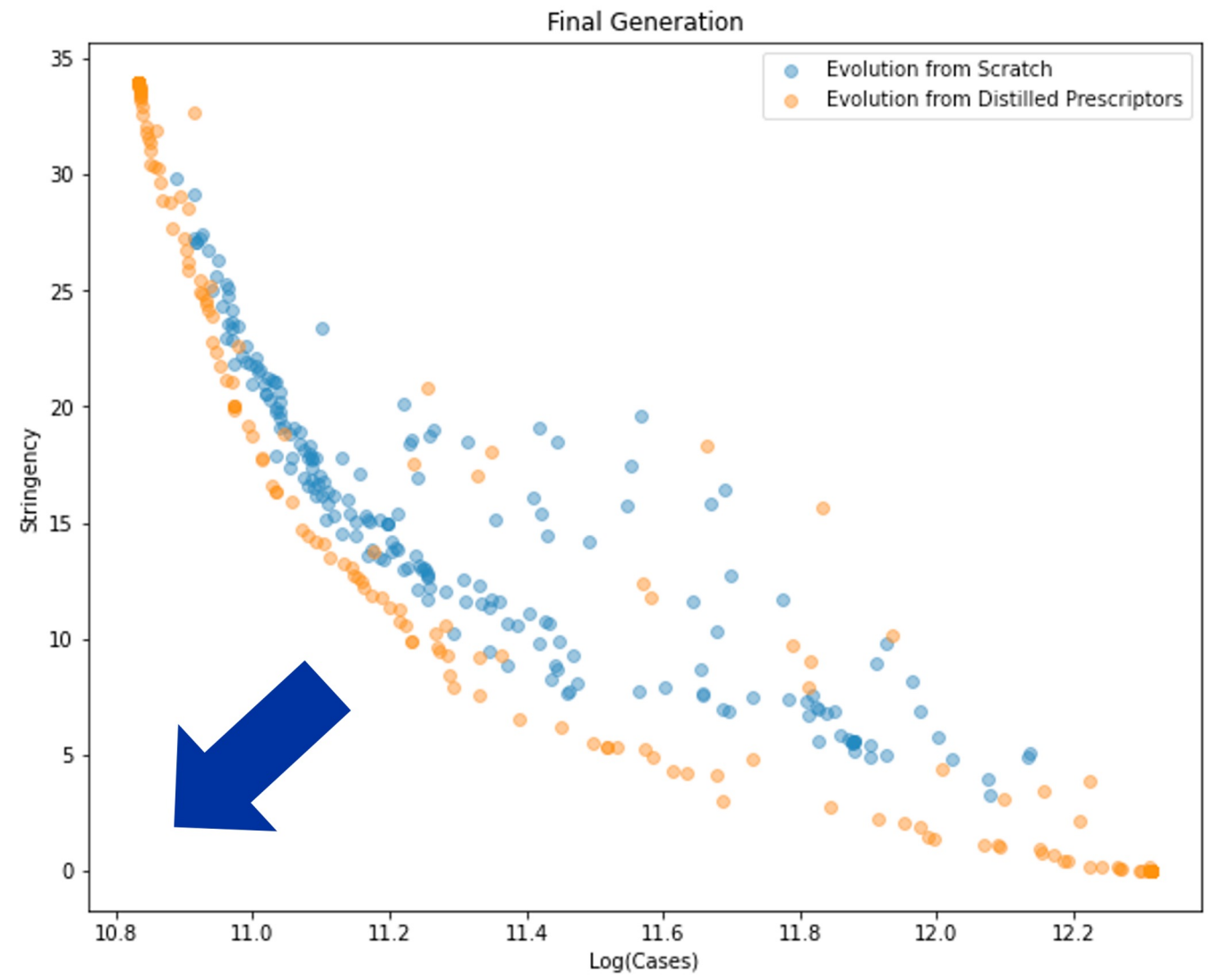
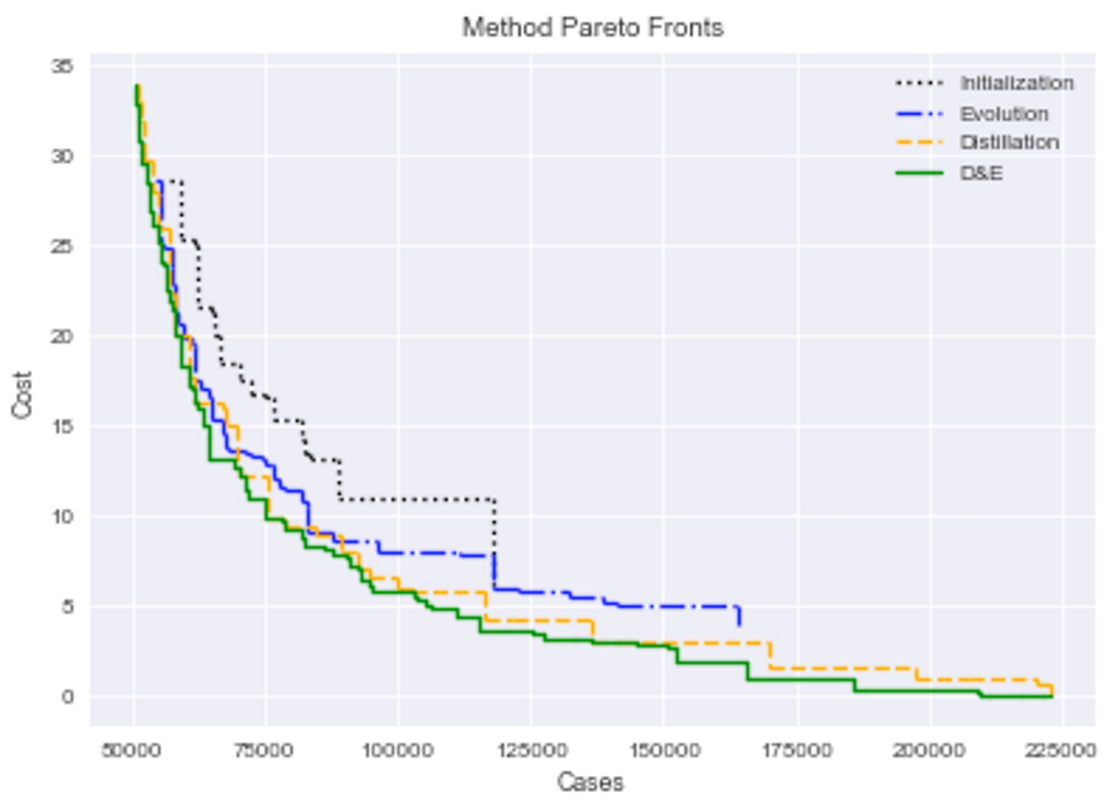
An xprize competition:
104 Data Science Teams
From 28 Countries
Global and Regional Data and Models

Needed:

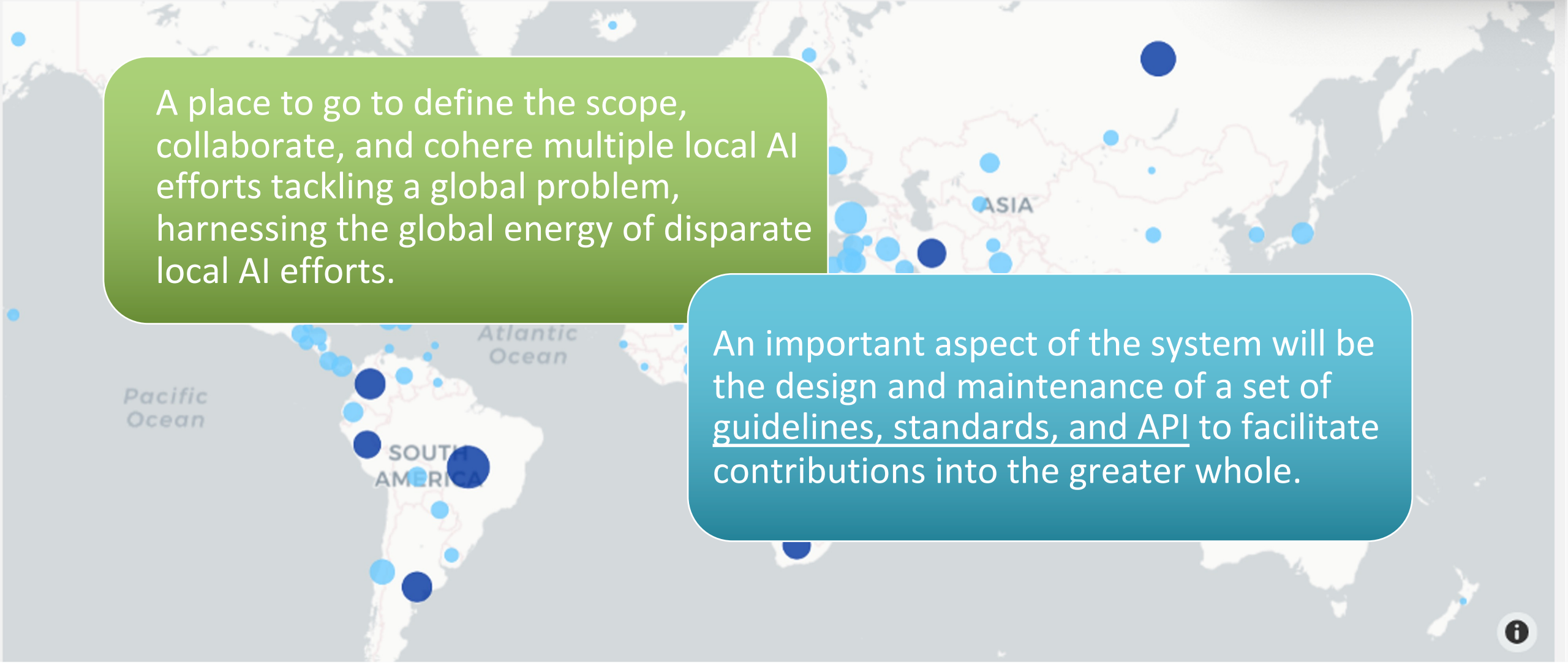
- A place to collaborate
- Interoperability and Standards
- More useful Dataset built from contributed data
- More useful Models built from contributed models

<https://evolution.ml/demos/npidashboard/>

Collaborative Models are Better Together!



Next step: Project Resilience Platform in other domain



A place to go to define the scope, collaborate, and cohere multiple local AI efforts tackling a global problem, harnessing the global energy of disparate local AI efforts.

An important aspect of the system will be the design and maintenance of a set of guidelines, standards, and API to facilitate contributions into the greater whole.

Project Status

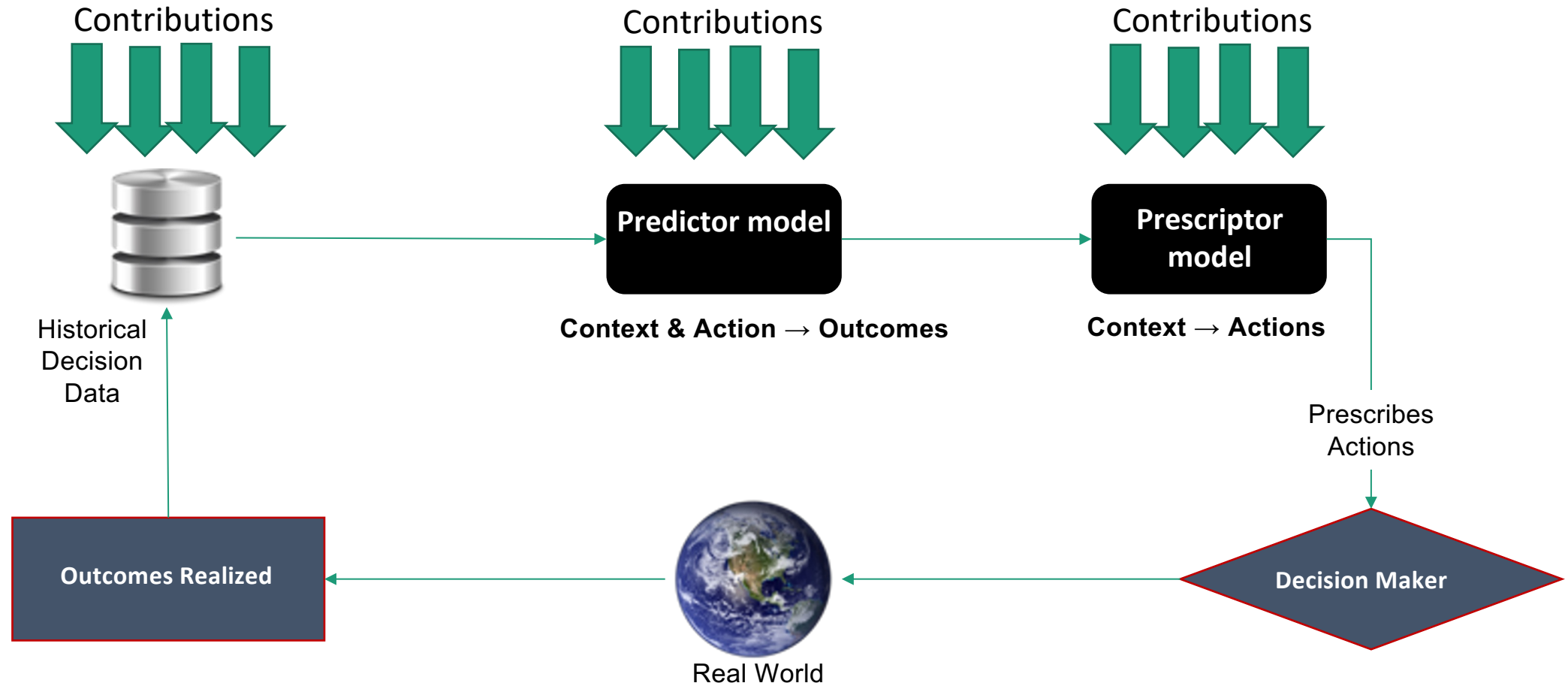
Current working group started in **Spring, 2022**. More than 20 volunteers signed up to collaborate on selecting a use-case as well as architecting and developing an MVP-level portal. The team meets online every other week as well as coordinating over slack (projectresiliencehq.slack.com), and contributions are tracked in our GitHub Account (<https://github.com/orgs/Project-Resilience>). The group is working toward a goal of **launching a first open platform using a climate project as an example - target: 2023/2024**.

PLATFORM



PLATFORM OVERVIEW

AI Contribution Points



MVP Assumptions



DATA ALREADY EXISTS



DATA IS PUBLIC AND DOES
NOT HAVE SECURITY/PRIVACY
CONSTRAINTS



SUBMITTED MODELS ARE
CALLED AND RUN ON
SUBMITTER LOCAL COMPUTE



FULL PROCESS OF MODEL
TRAINING IS DISCLOSED BY
CONTRIBUTORS

Project Resilience data exploration

Data requirements defined



Data should cover variations of decisions sufficiently



Observe the outcome of an action in a reasonable amount of time (e.g., less than 3 months)



Data should include context, actions, outcomes for each observation



Data should come from reliable, trusted, scientific, ethical sources

Project Resilience Domain example: Climate

Context

(e.g., geographic and local qualities)

Region
Population
GDP
Energy usage
Land cover usage
Cost of energy

Action

(e.g., transitioning to clean energy)

Regional plant transitions proposed
Subsidies
Policies
Adaptation actions

Outcomes

(e.g., reduce emissions and cost)

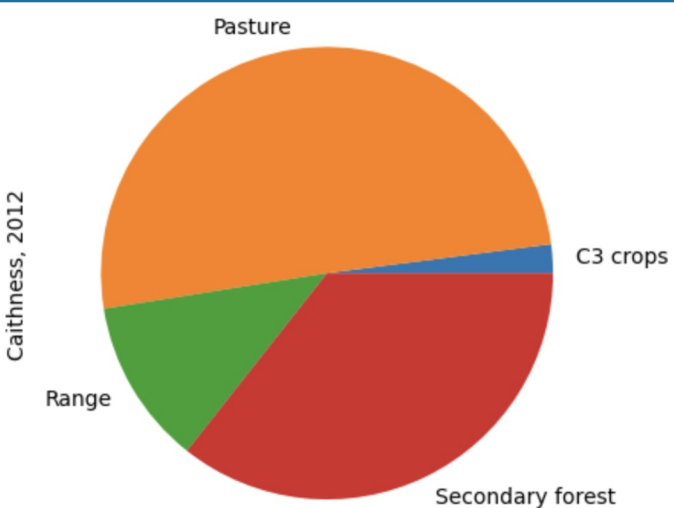
Emissions (CO₂, N₂O, CH₄, ...)
Energy production
Transition cost

Project Resilience data exploration example:

IPCC - Global Carbon Budget - Emissions from Land Use Change

Context

- *Region*
- *Land cover usage*



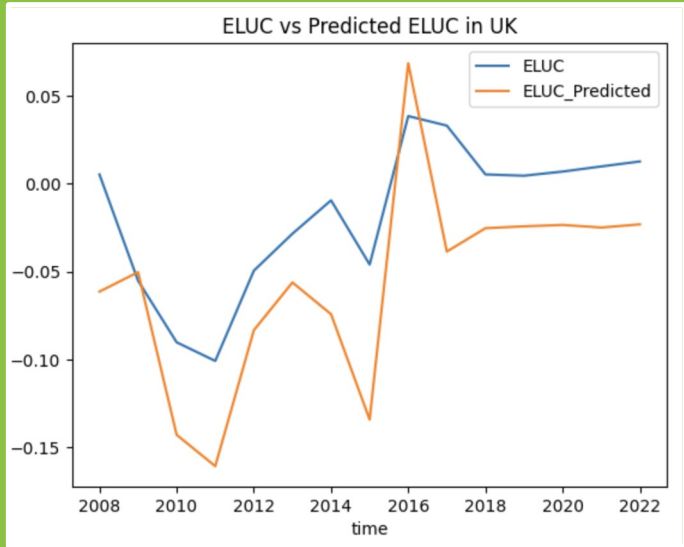
Actions

- *Land Use Change*

C3 crops diff	0.000283
Pasture diff	-0.003074
Range diff	-0.000801
Secondary forest diff	0.003570
Urban diff	0.000000

Outcomes

- *CO2 Emissions*
- *Transition cost*

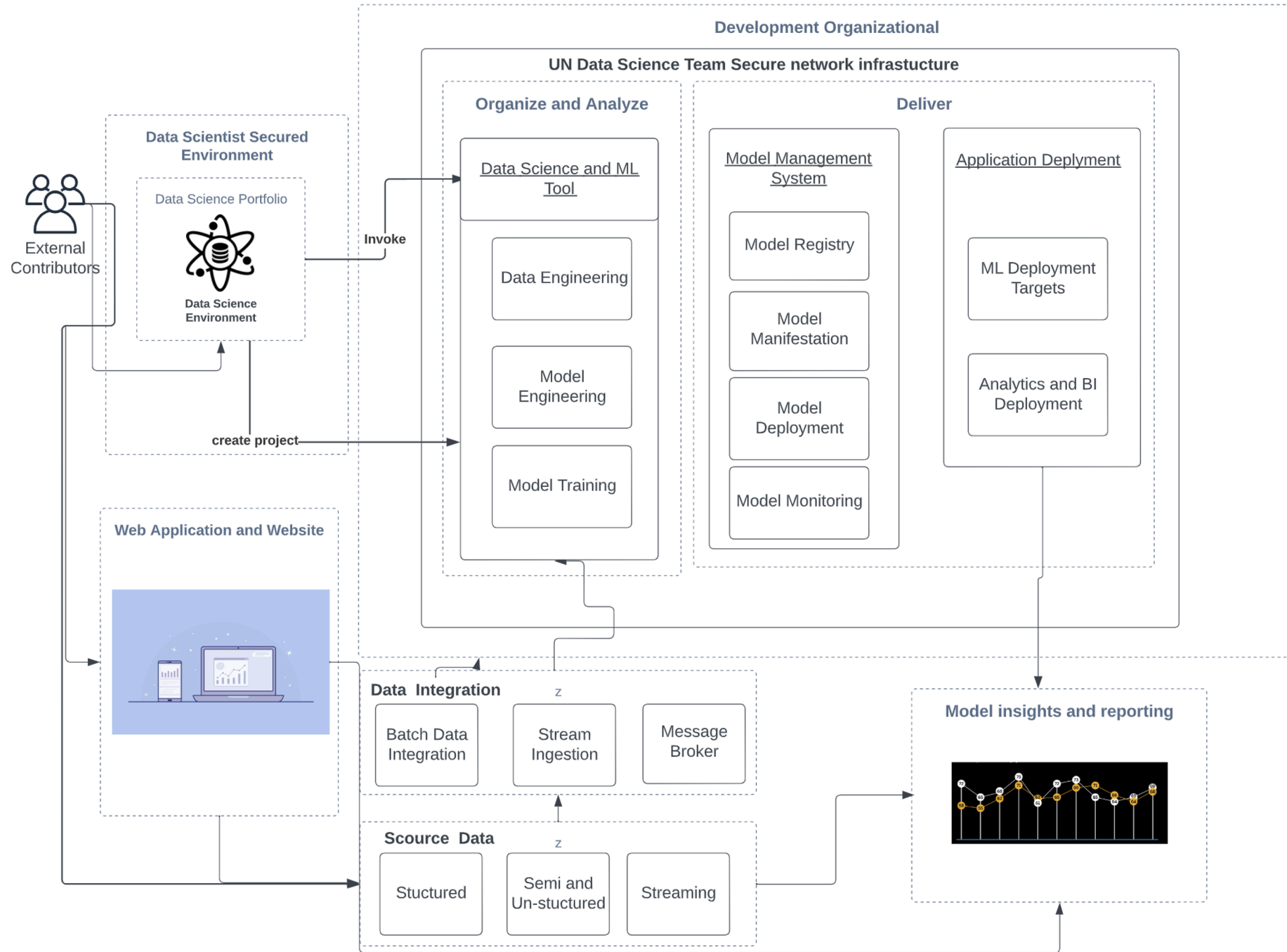


ARCHITECTURE FOR MVP

Architecture requirements:

- Component 1 and 7: Secure AI Development Environment for AI community contributors (e.g., AWS Service Catalog)
- Component 2: Data Science Developer IDE (e.g., SageMaker Studio domain)
- Components 3 and 4: MLOps for automated model development and deployment workflow (e.g., SageMaker MLOps project templates)
- Components 5 and 6: Automated quality, governance, and regulations for Models (CI/CD workflows)
- Component 8: Data Store (Secured Data Lake)
- Component 9: Insight analysis (e.g., Amazon QuickSight and Web App)
- Component 10: Bring your Own Model

Conceptual UN AI/ML Architecture



Next steps to release MVP

Ensembling of submitted models that include predictor models (take context and actions as input, predict outcomes) and prescriptor models (take context as input, prescribe actions optimizing desired balance of outcomes)

Automated module to assess and compare models by making calls to models hosted by 3rd parties or submitters

Guidelines for AI Contributors on data requirements and format (context/action/outcomes column) and lifecycle considerations

Final Platform

Data scientists and ML experts can submit solutions that comply with certain API standards, maybe in the form of Predictor/Prescriptors



The recommendations of the system can be used globally by anyone and implemented locally

An evaluation testbed is provided to assess and compare submissions quantitatively

Appropriate Data and Funding requirements can be showcased/explained

Volunteers Needed



Tech program management



AI/ML



Data Science



Dev and System Ops



UI/UX



Legal / Security / Privacy

Data Contributions Needs

- To identify contributors and their roles (relationships) as data suppliers (sources)
- To evaluate conversion of collected data into publicly available data and/or data sets for predictors
- To get help validate data quality with appropriate KPIs
- To get data clearing house support as a platform to aggregate the data
- To curate data with common data models for shared taxonomy
- To support data features (context/action/ outcomes) and repositories (local storages)
- To support data life cycle management
- To ensure security, privacy, and trust as well as legal compliance including data ownership

Standard opportunity: Data sharing in a standardized way with interoperable interfaces

Project Outcome expected with LF

⇒ An open portal + platform to integrate constituents of a collaborative AI decision-augmentation system

- Help decision making authorities and organizations tackling issues such as climate change, ecological disasters, disease control, water management, economic inequity, diversity and inclusion...

⇒ A framework for collaboration on AI predictive and prescriptive models

⇒ Allow for :

- Local Learnings, Data agency, and Model development and deployment in various communities
- All models harnessed into a greater global whole

