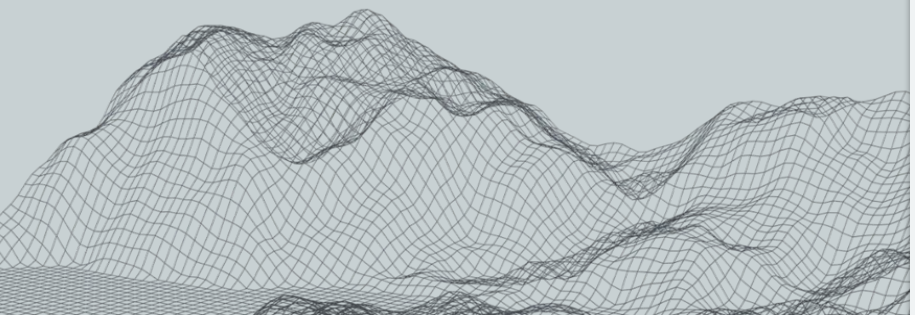
Models and Data for All Hazards – introducing TDIS

Overview of Texas Disaster Information System
& a discussion of our initial use case

March 9, 2022

AGENDA

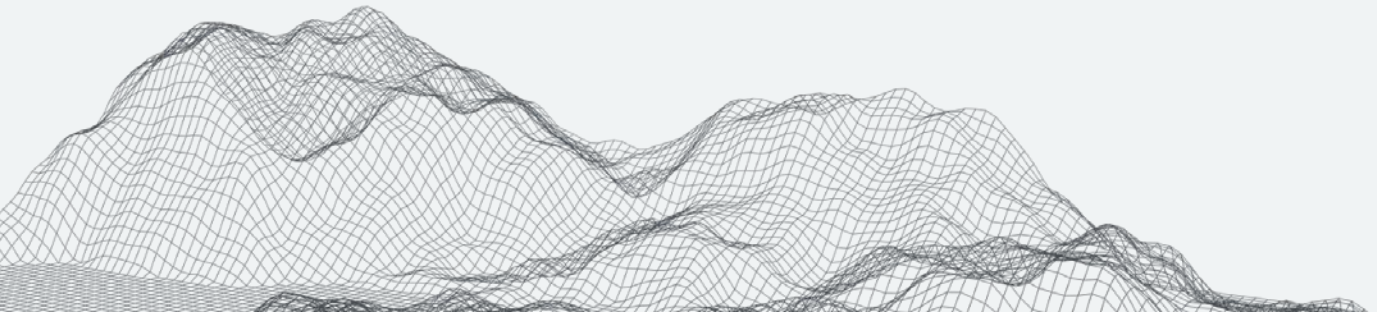
TNRIS Forum
March 9, 2022



5 minutes	Introducing IDRT & TDIS
5 minutes	TDIS Design Concepts & Approach
5 minutes	Use case Discussion
5 minutes	Discussion / Wrap Up

INSTITUTE FOR A DISASTER
RESILIENT TEXAS

The cornerstone project for the Institute is the Texas Disaster Information System (**IDRT**). This project is currently its initial implementation phase, but will be an interactive, analytical, and visual web-based spatial data system designed to support more resilient decision making at the state level.

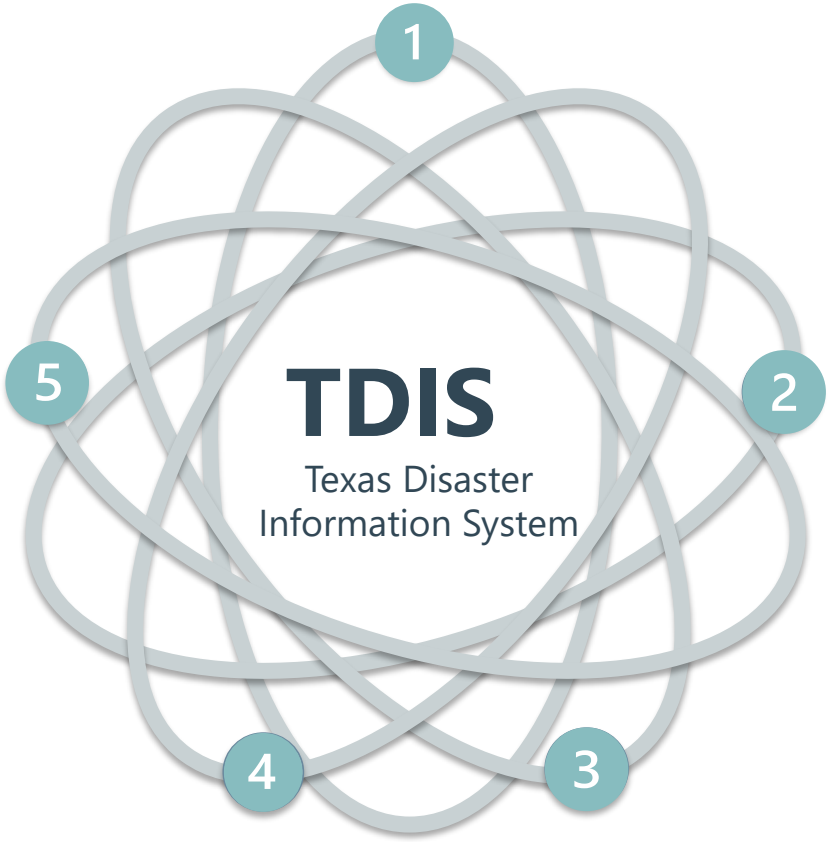


INSTITUTE FOR A DISASTER RESILIENT TEXAS

The cornerstone project for IDRT is the Texas Disaster Information System (TDIS).

IDRT Program Areas

1. Hazard Analytics
2. Risk Communication & Perception
3. Policy & Decision Support
4. Education
5. Coastal Risk Reduction



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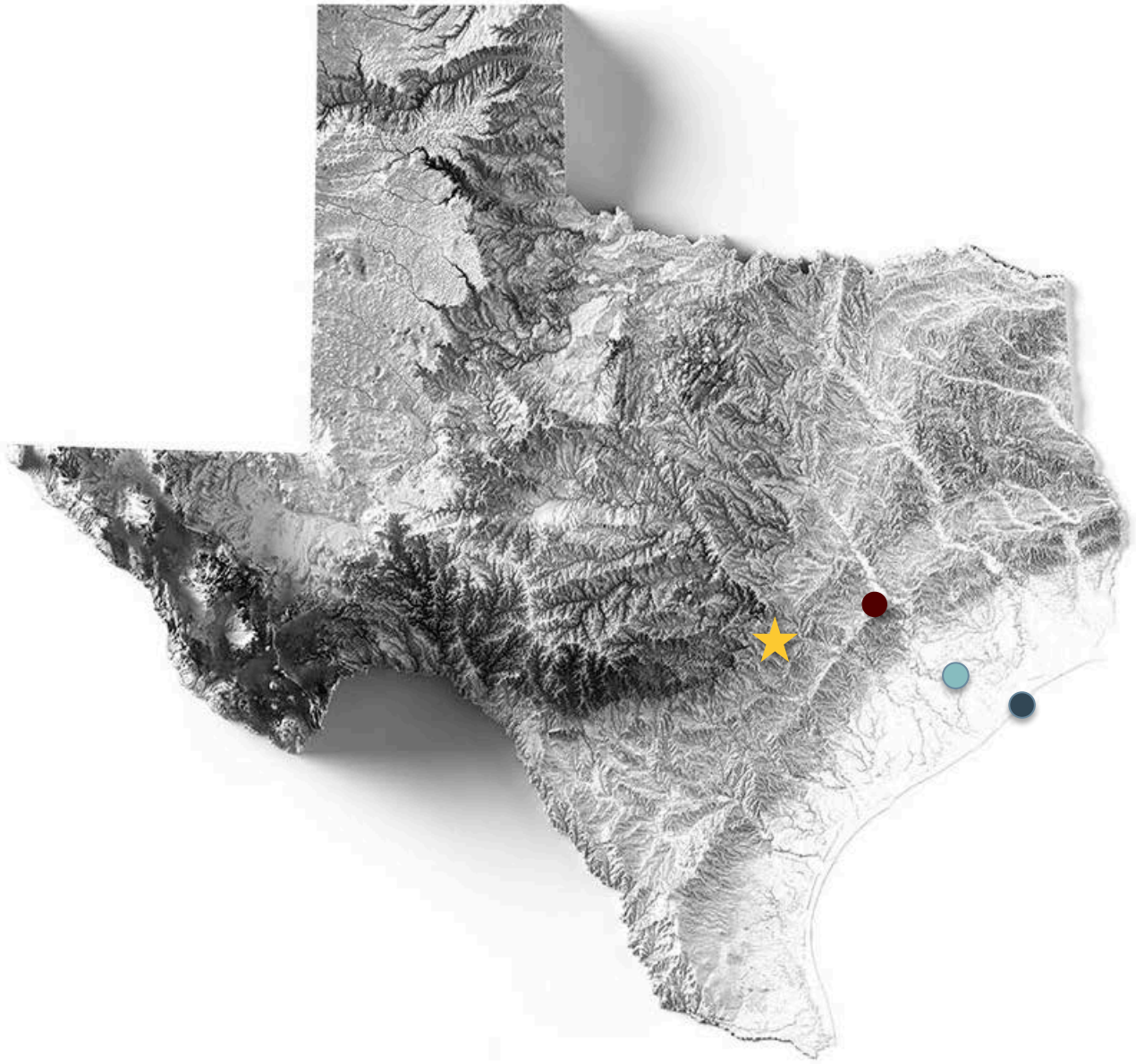


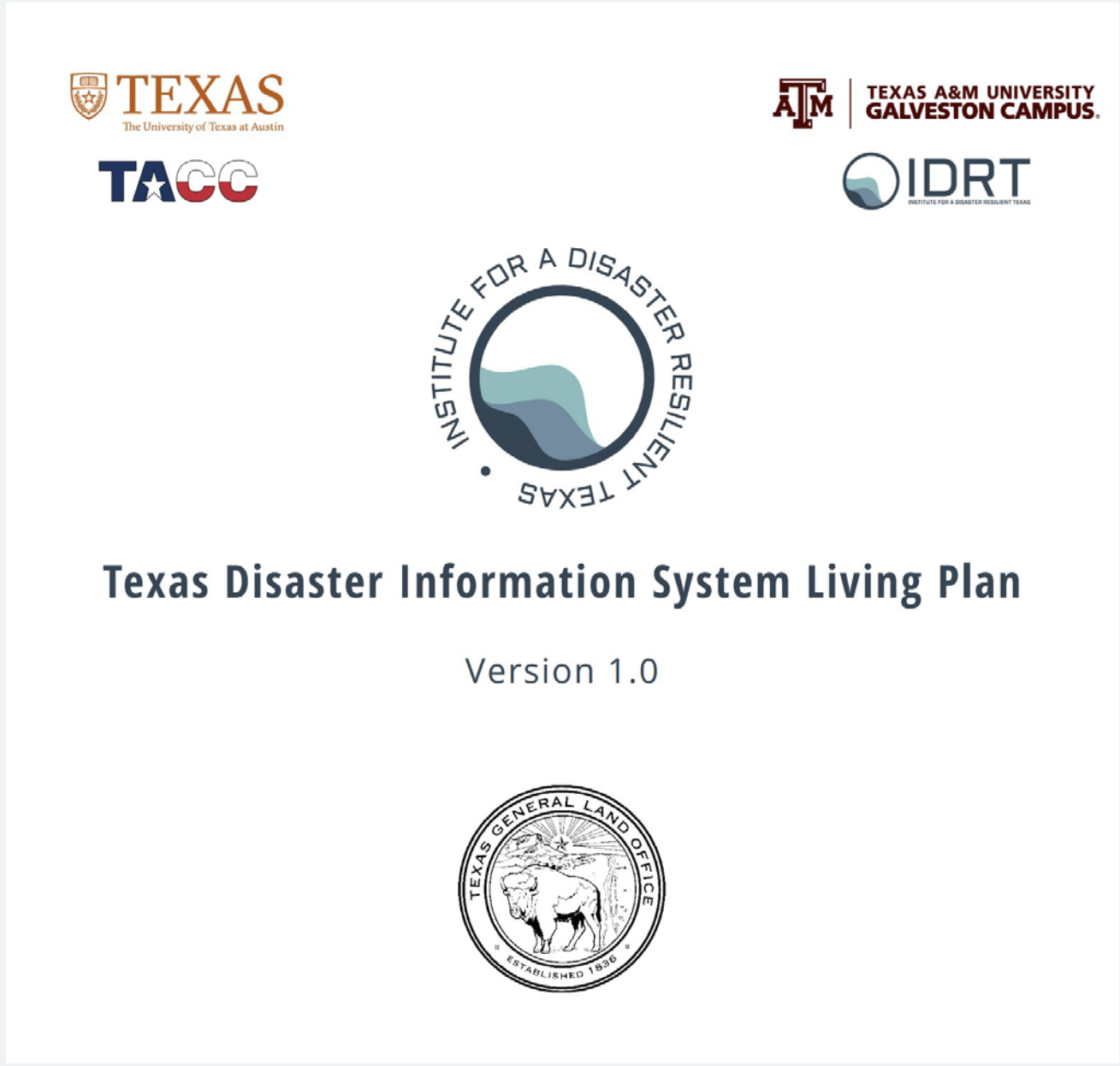
Logistics & Operation

We are transdisciplinary and multi-institutional with funding from project-based grants/contracts and indirect return.

- **Created by TAMU System**
- **IDRT is located in Houston**
- **Administration based at TAMUG**
- **Partnered with UT Austin (TACC, CSR, Oden)**
- **Acts at the State-Wide Level (and beyond?)**

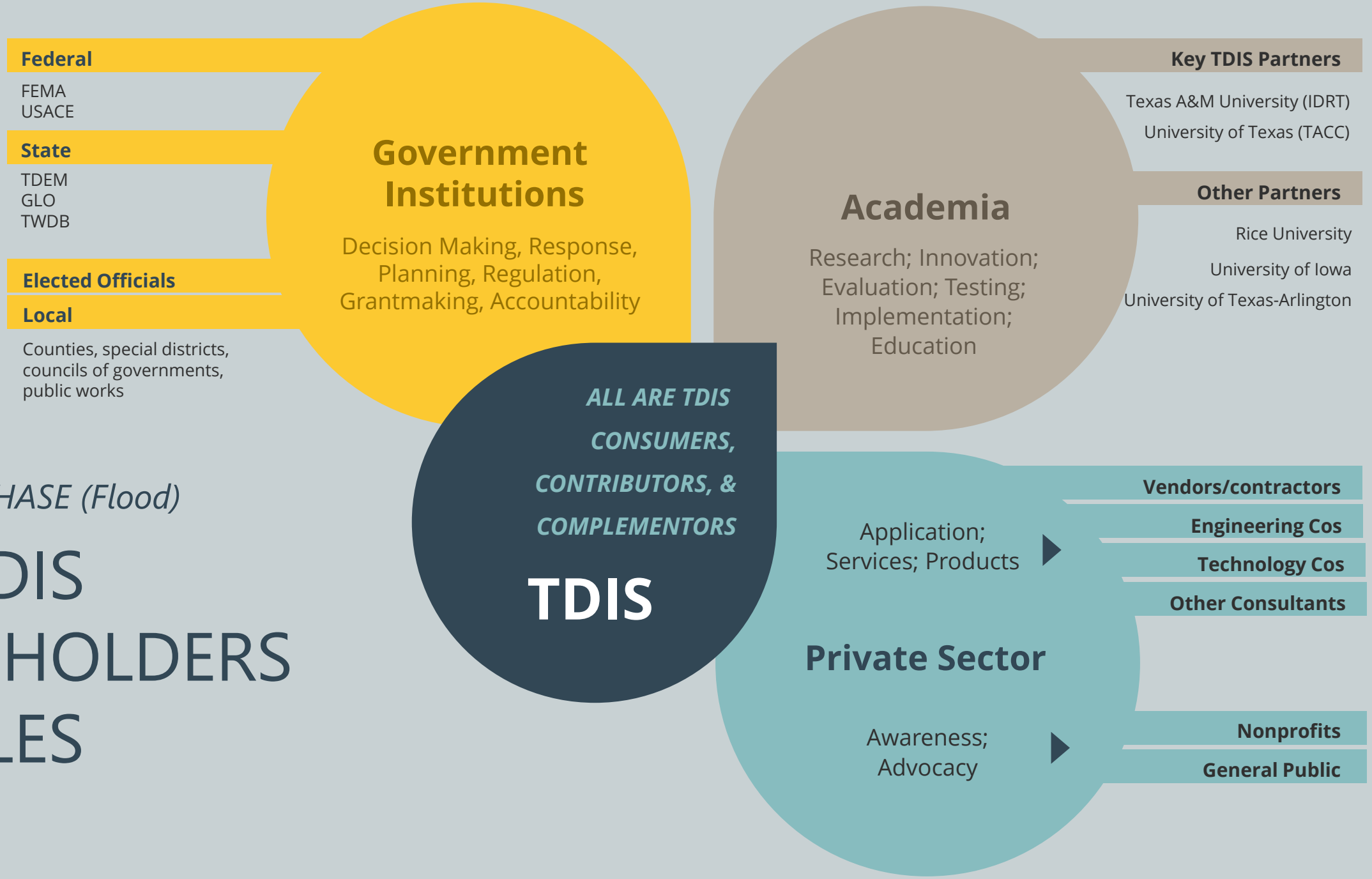
TDIS DRAFT Living Plan Version 1.0 has Published

https://tdis.io/



CURRENT PHASE (Flood)

KEY TDIS STAKEHOLDERS & ROLES



TDIS Conceptual Architecture To Implementation

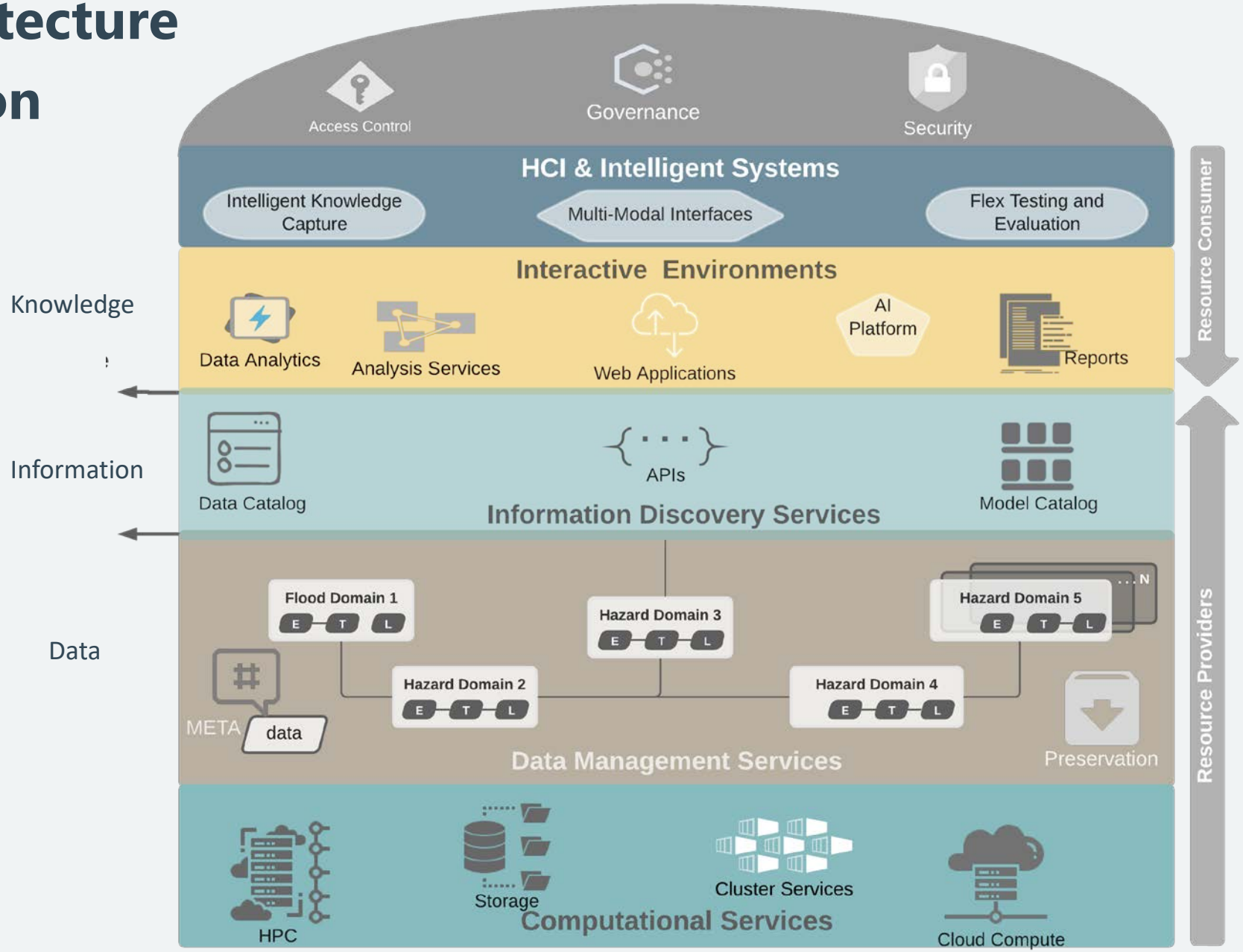
Defines data domains by hazard type

Distinguishes Thresholds

- Data-to-Information
- Information-to-Knowledge

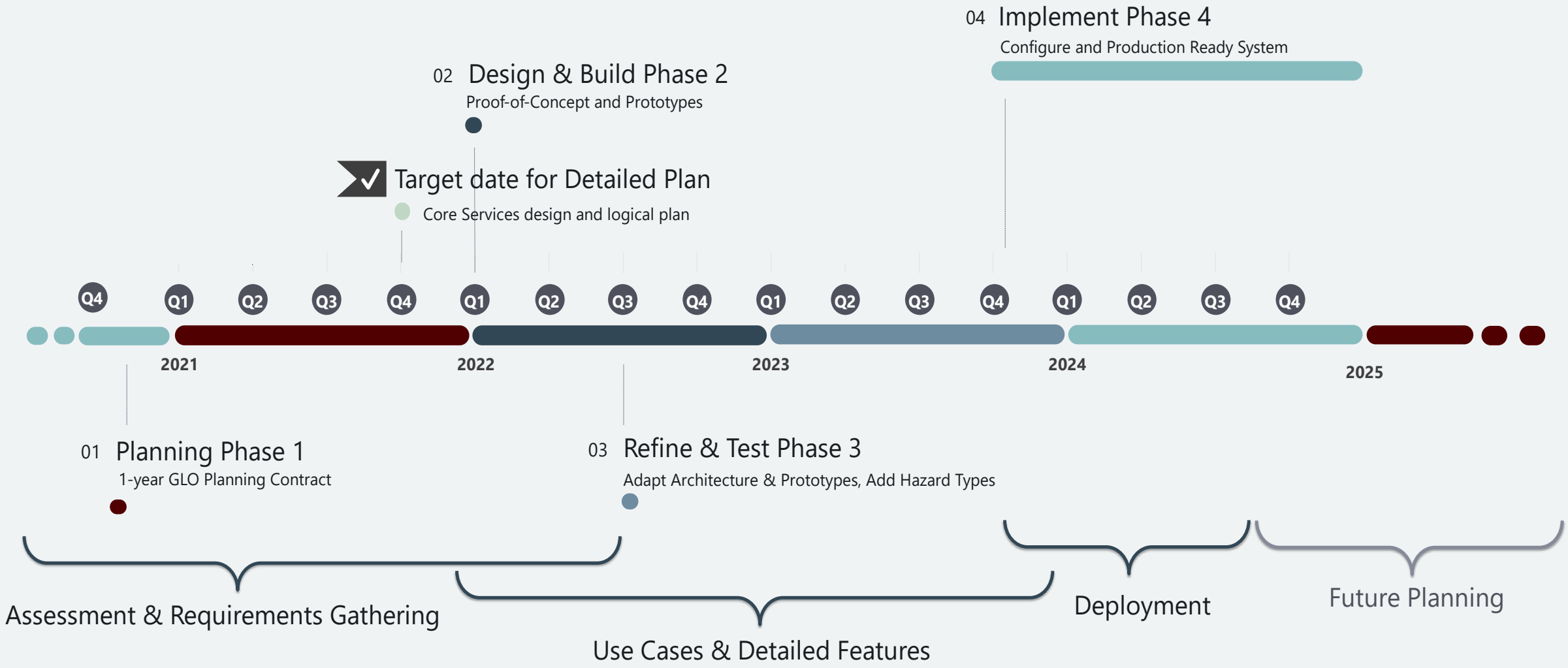
Design will consider multiple strategies to manage

- Data-proximate computing
- Hybrid compute services
- Processes to define data models
- Data registration tiers
- Reusable workflows & algorithms
- Usability and flex test protocols
- Cross-organizational security



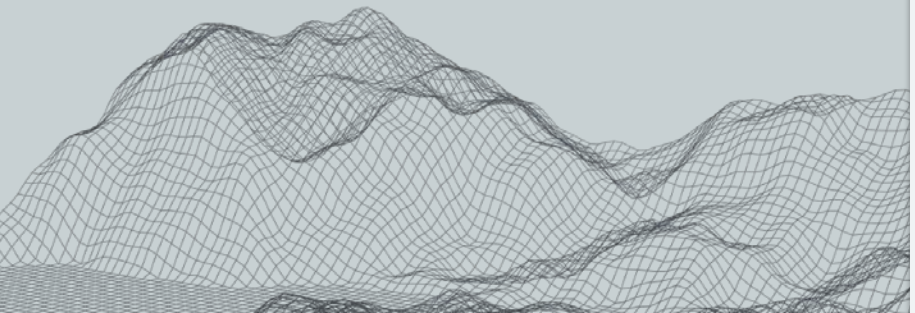
TDIS Development Timeline

TDIS adopts an iterative and agile approach to development.



Remember -
TDIS
is an
All Hazards System

But
the INITIAL FOCUS
is Flooding



Hazard Types

Flooding as initial focus hazard...

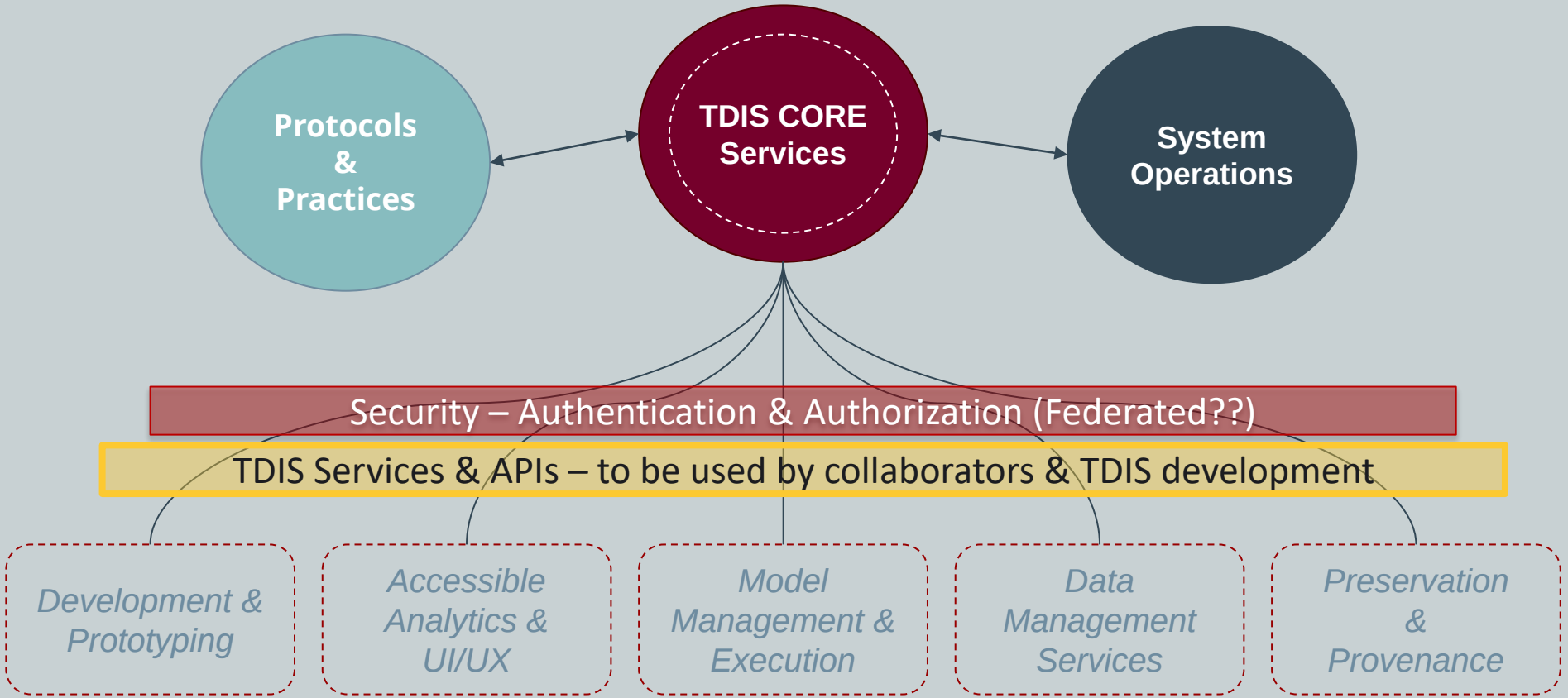
... then add and iterate into the eventual all-hazards system.

Disaster Domains/ Use Cases

Start with a focus on *direct tie-ins* to existing **planning and mitigation** programs**...**

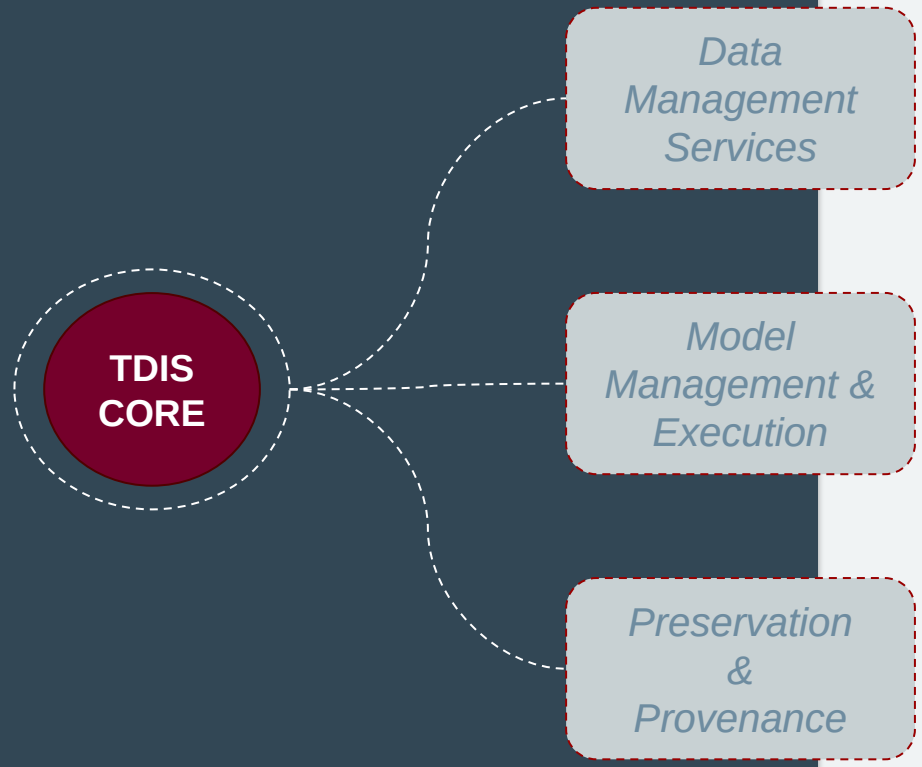
... with intention to *support* recovery and response.

Core TDIS Services Breakdown



TDIS Ecosystem

Implementation 0-18 months

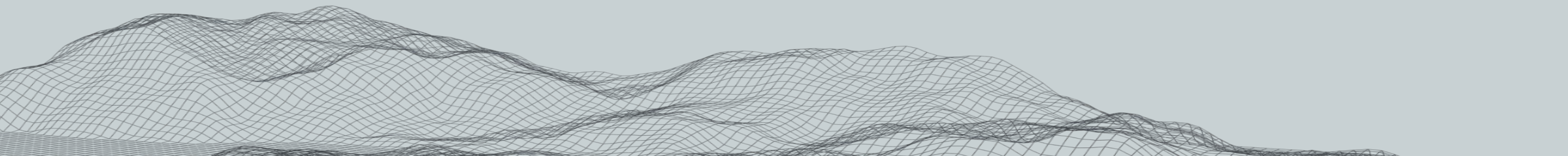


Use Cases

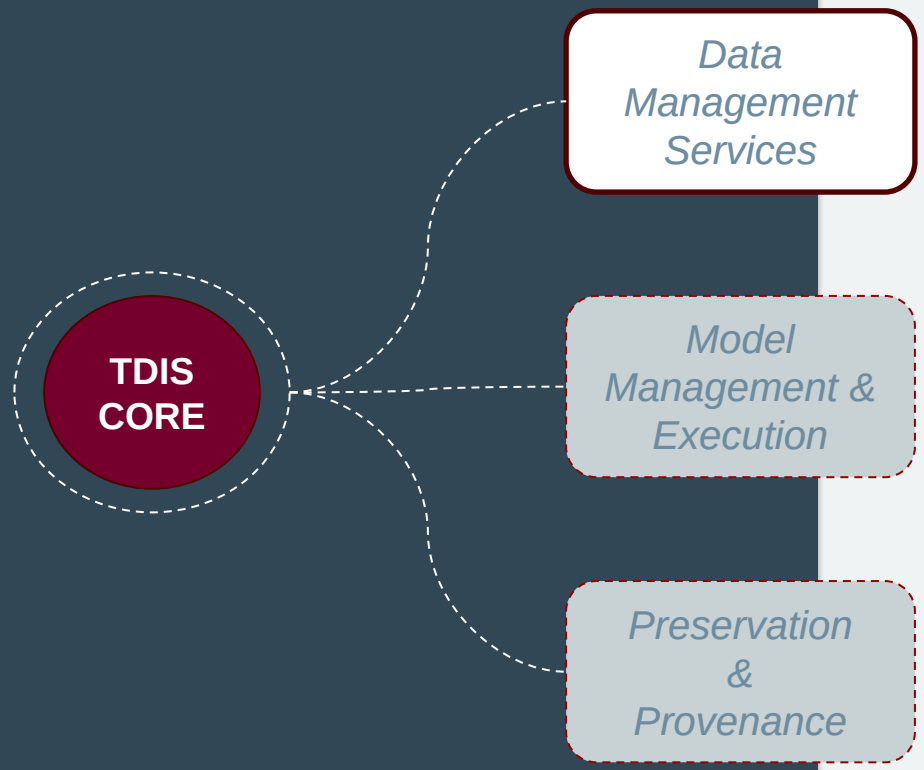
- Domain problems drive the use case selection
- Initial implementation includes straightforward examples
- Early use cases tightly connected with feature requirements
- Initial use case(s) have arisen organically
  future use cases will be selected using a rubric or SOP

Introducing - Model Management System (ms2)

- **Project in co-development (TWDB Team, headed by Reem Zoun)**
  - Flood Planning Coordination with TWDB
  - Assist with flood model metadata descriptions
  - Develop a model & data indexing service for both regional and central TWDB staff for registering and uploading models and associated data
  - TWDB Staff then ‘accept’ the models after both an automated and human check of the model, metadata and structure



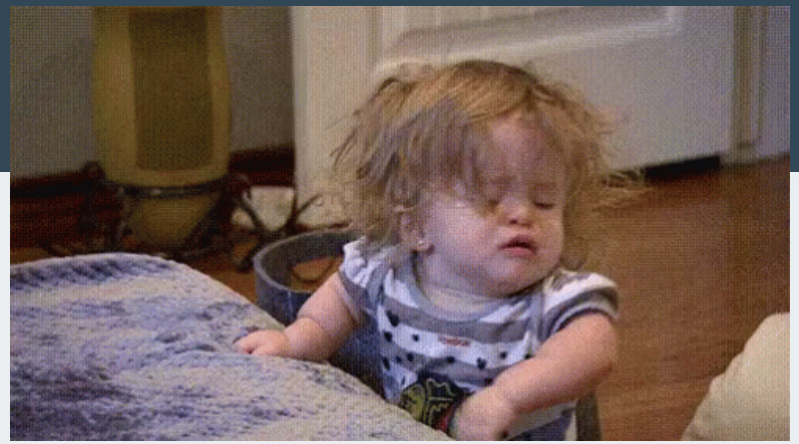
TDIS Ecosystem
Implementation 0-18 months



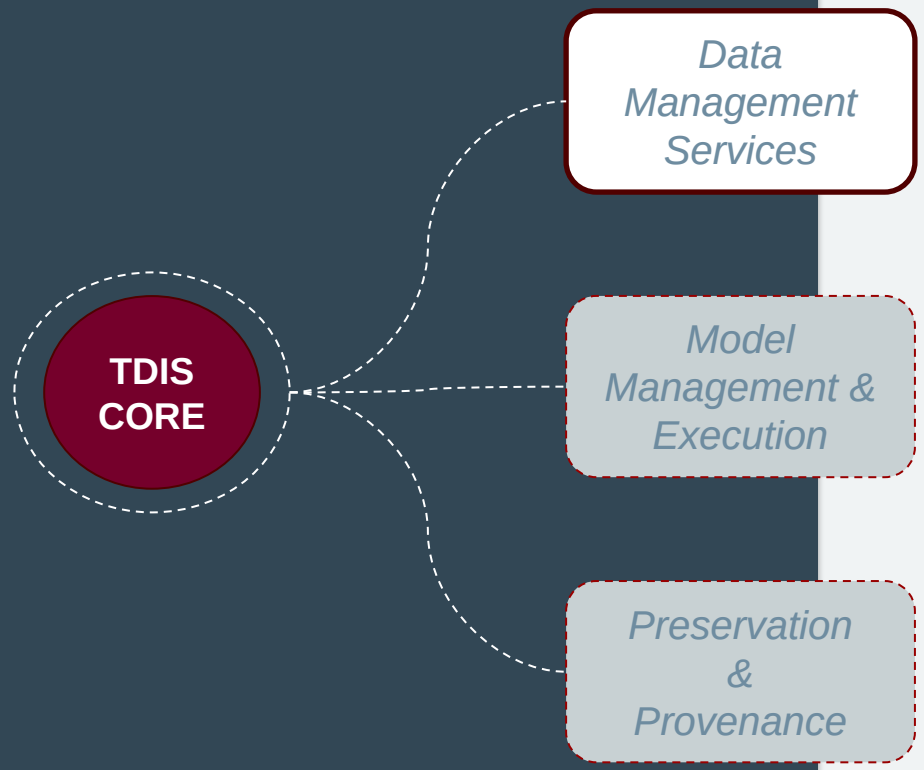
MS2 Use Case - details

- In Flight right now – user testing finished in April!
- Provides mechanisms to register metadata through a user interface for vendors
- Provides means of uploading very large archives (up to 50gb) of data to TDIS file system
- Provides TWDB Staff the means of visualization files and directory structure and validate models and associated files through online web application
- But to really discuss the system we need to discuss metadata for a bit…

Metadata???!!!???



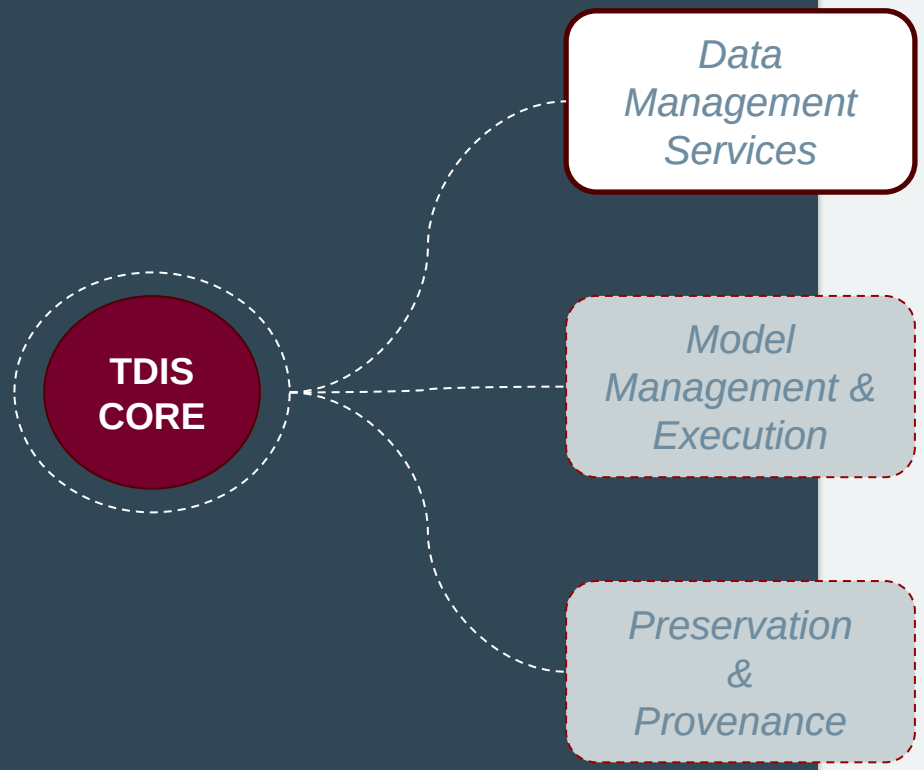
TDIS Ecosystem
Implementation 0-18 months



MS2 Use Case – details
No really - Its all about the metadata!

- Our working metadata specification provided the basis of our TDIS DB Data model – published here https://github.com/TexasDIS/metadata
- That data model has provided development teams with a basis for discussions on workflows and synergy
- Having the metadata also provides a starting point for how TDIS is categorizing problem spaces. And then the comparison of that problem space with collaborators.

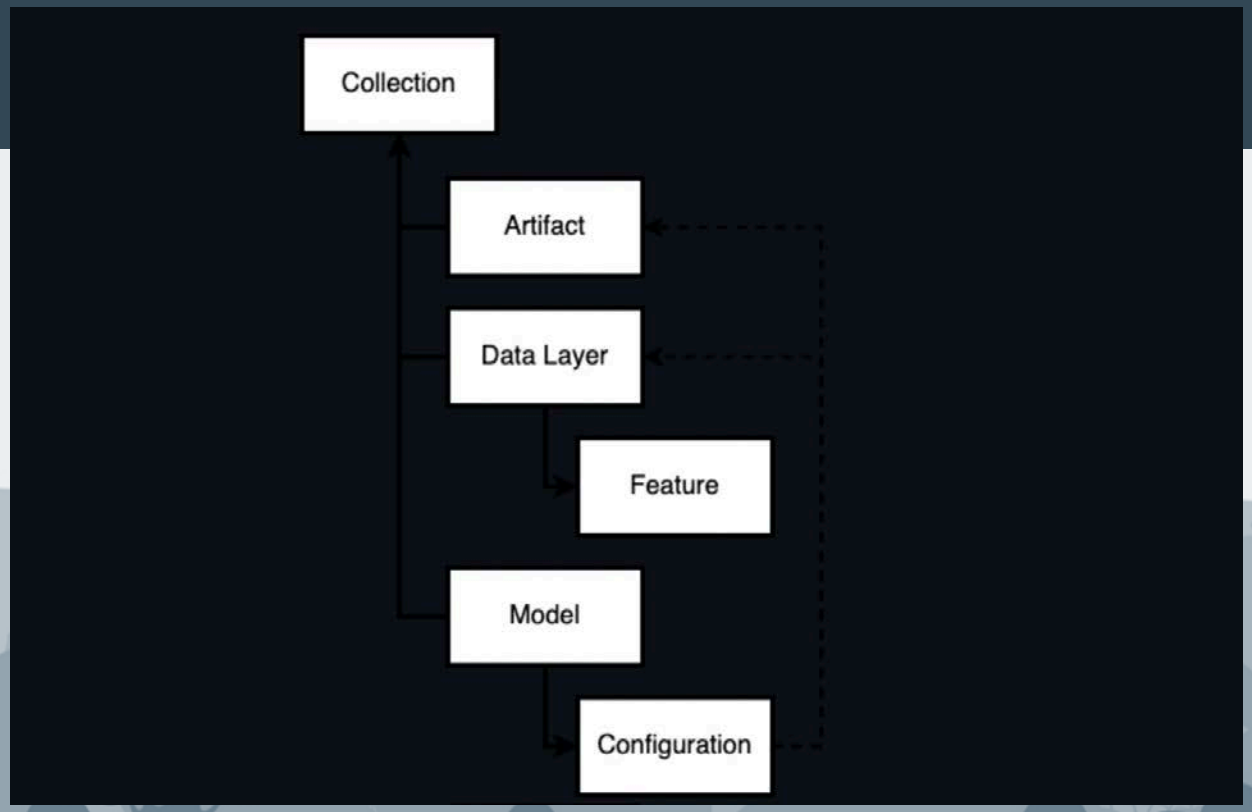
TDIS Ecosystem
Implementation 0-18 months



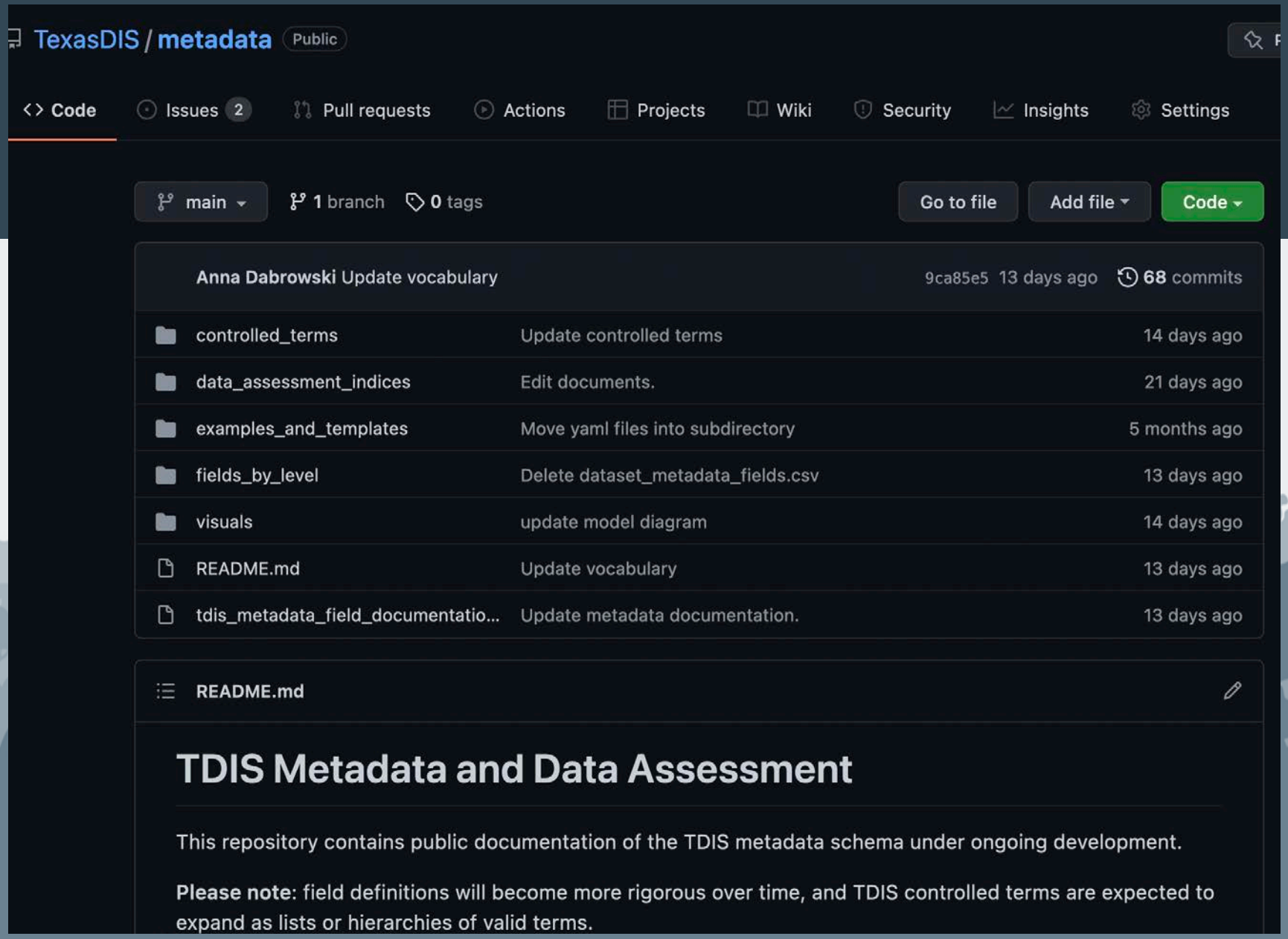
MS2 Use Case – details
It's all about the metadata!

- The basis of the model is a Collection – a logical construct that could take the form of a project, spatial extent, or any other grouping of files.
- Collections can have Layers, Models and Artifacts within them
- The specification is published for each of the digital objects
- Each of these then provides a starting point for building workflows with partners and projects. Having the specification transparent means that others then can map or have us map their information to ours. This business model has provided novel and emergent use cases for future development

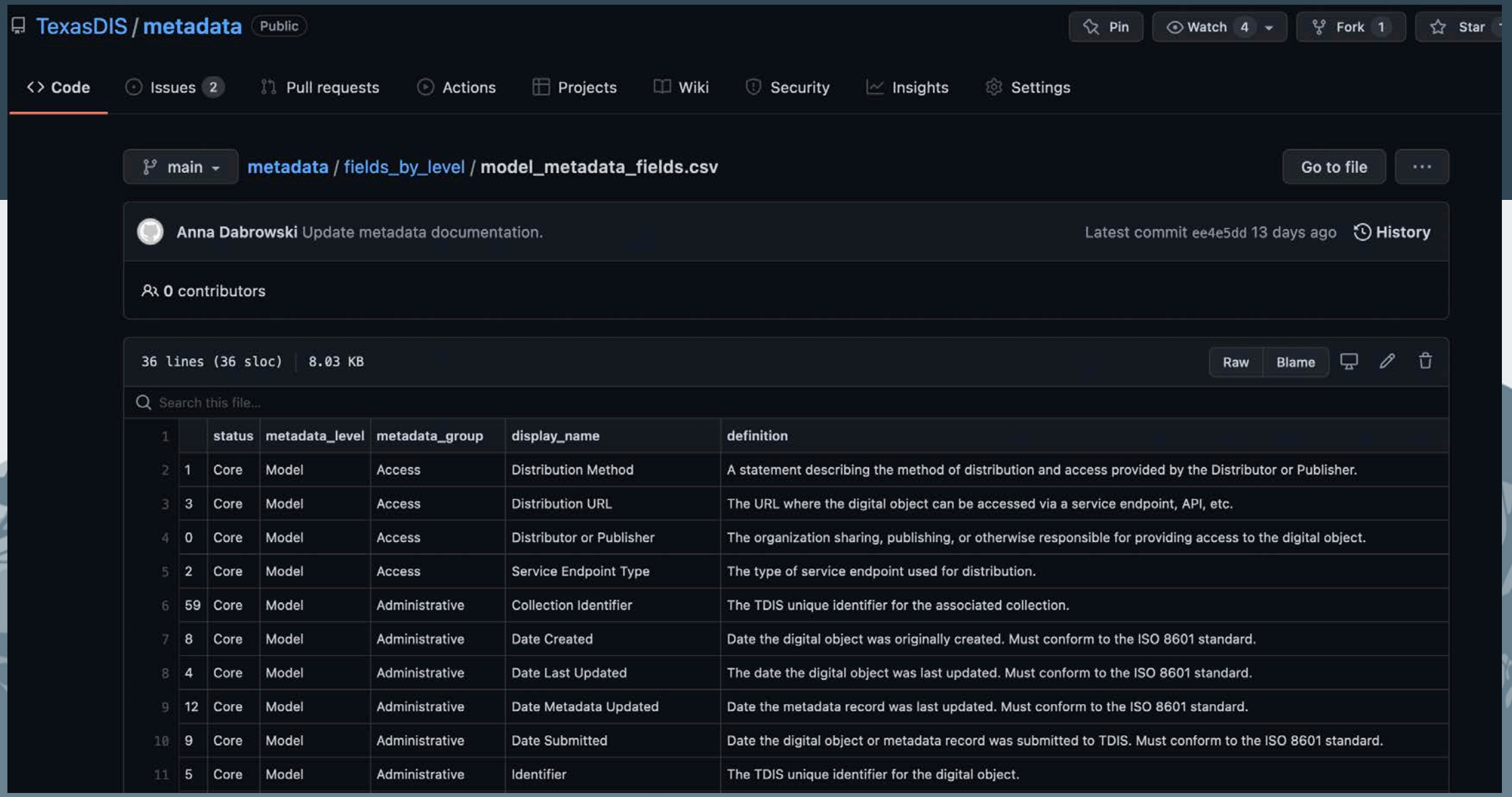
Metadata


Collection
Artifact
Data Layer
Feature
Model
Configuration

Metadata

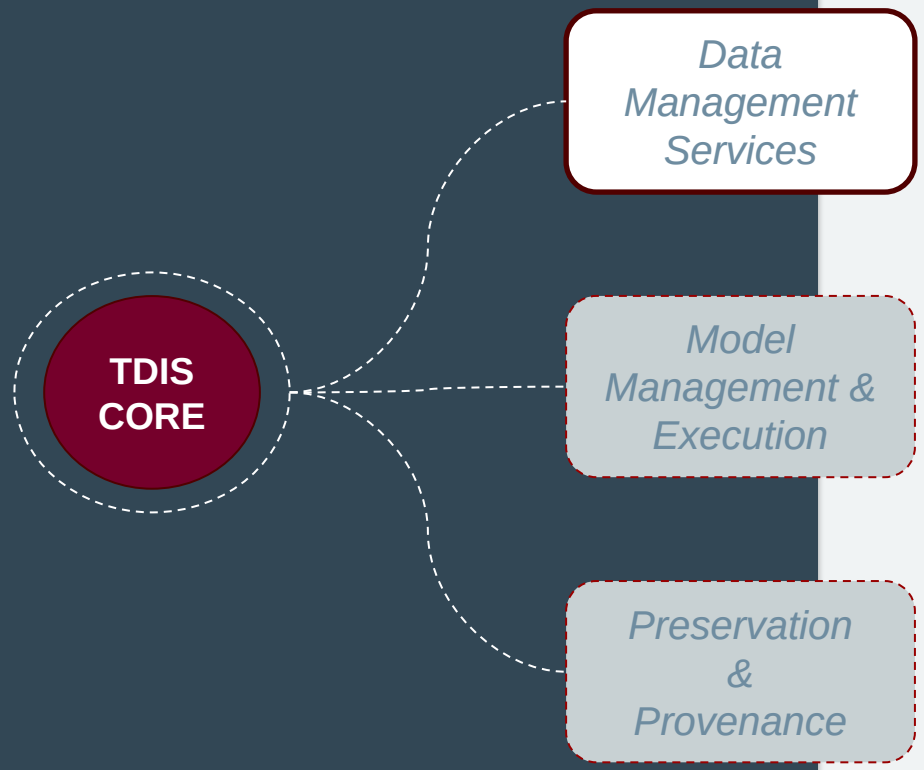

TexasDIS / metadata
Public
Code
Issues 2
Pull requests
Actions
Projects
Wiki
Security
Insights
Settings
main
1 branch
0 tags
Go to file
Add file
Code
Anna Dabrowski Update vocabulary
9ca85e5 13 days ago
68 commits
controlled_terms Update controlled terms 14 days ago
data_assessment_indices Edit documents. 21 days ago
examples_and_templates Move yaml files into subdirectory 5 months ago
fields_by_level Delete dataset_metadata_fields.csv 13 days ago
visuals update model diagram 14 days ago
README.md Update vocabulary 13 days ago
tdis_metadata_field_documentatio... Update metadata documentation. 13 days ago
README.md
TDIS Metadata and Data Assessment
This repository contains public documentation of the TDIS metadata schema under ongoing development.
Please note: field definitions will become more rigorous over time, and TDIS controlled terms are expected to expand as lists or hierarchies of valid terms.

Metadata



	status	metadata_level	metadata_group	display_name	definition
1	Core	Model	Access	Distribution Method	A statement describing the method of distribution and access provided by the Distributor or Publisher.
3	Core	Model	Access	Distribution URL	The URL where the digital object can be accessed via a service endpoint, API, etc.
0	Core	Model	Access	Distributor or Publisher	The organization sharing, publishing, or otherwise responsible for providing access to the digital object.
2	Core	Model	Access	Service Endpoint Type	The type of service endpoint used for distribution.
59	Core	Model	Administrative	Collection Identifier	The TDIS unique identifier for the associated collection.
8	Core	Model	Administrative	Date Created	Date the digital object was originally created. Must conform to the ISO 8601 standard.
4	Core	Model	Administrative	Date Last Updated	The date the digital object was last updated. Must conform to the ISO 8601 standard.
12	Core	Model	Administrative	Date Metadata Updated	Date the metadata record was last updated. Must conform to the ISO 8601 standard.
9	Core	Model	Administrative	Date Submitted	Date the digital object or metadata record was submitted to TDIS. Must conform to the ISO 8601 standard.
5	Core	Model	Administrative	Identifier	The TDIS unique identifier for the digital object.

TDIS Ecosystem
Implementation 0-18 months



MS2 Use Case – details
OK – AND also about the data

- Another important aspect of TDIS is the ability to provide storage and bandwidth for uploading and downloading very large file archives
- Building out a workflow to provide these services to partners has also provided us with opportunities with other partners.
- Very large archives (> 7GB) are hard to *shove around* on the internet. SO, this service becomes a useful starting point in attracting interesting to TDIS
- A little about the solution – I am using java, the S3 API and MinIO to orchestrate the stable transfer of 30+ GB archives

TDIS Ecosystem

Implementation 0-18 months

Other Use Cases – in dev or upcoming

GLO Regional Flood Studies

In progress

1. Collect and ingest datasets and digital objects from 4 regions.
2. Coordinate with GLO Vendors to design features and capabilities.
3. First data services test cases.

State Hazard Mitigation Plan

- Project is in-flight
  1. Collect and store high quality hazards data
  2. Develop a statewide relational hazards database.
  3. Perform statewide hazard exposure, vulnerability, and risk assessments.

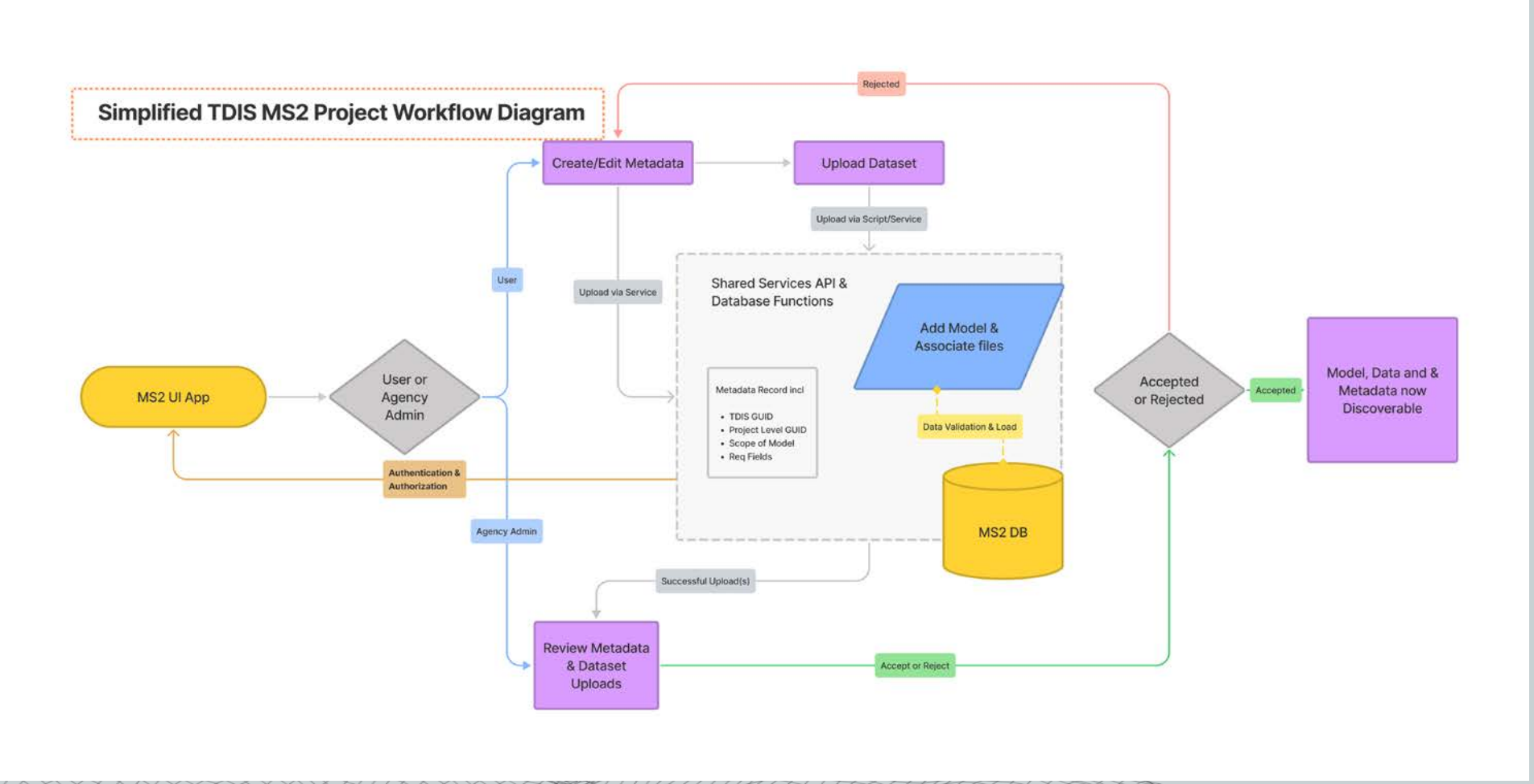
Louisiana Model Management System

- Project is in co-development (TWI & Hugh Roberts)
  1. Develop data inventory metadata services

??? Opportunistically Optimistic

Introducing - Model Management System (ms2)

- *Obligatory Workflow Diagram*



Thank you!

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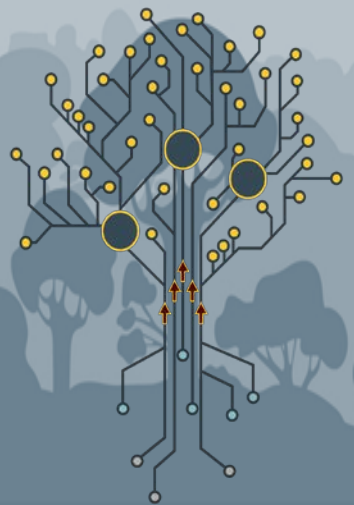

Discussion