



UNIVERSITY OF
MARYLAND

ICS DATA MODEL COORDINATION

Capstone – INFM737

By – MIM Team ARLIS (Spring 2024)

OVERVIEW

- Our Team
- Introduction
- The Problem
- The Solution
- The Challenges
- Result
- Next Step
- Questions



MIM ARLIS TEAM

We are a team of four trying to solve the problem of automating data input from a variety of sources to a unified data model, generating required reports for the ARLIS Identity team



Shashank



Steicy



Adhira



Usha

INTRODUCTION

CLIENT

- ARLIS - UMD Applied Research Lab for Intelligence and Security (Est. 2018)
- 1 out of total 14 UARC Across US
- Strategic Asset for AI, Information Engineering, and human systems research.

PROJECT - ICS DATA MODEL COORDINATION

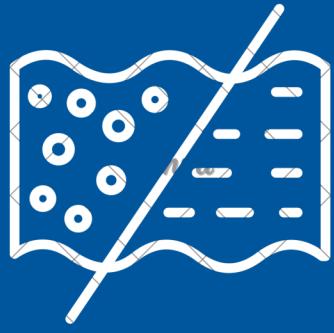
- Information Competition Simulator - software that is designed for modeling human behaviour.
 - Simulates how information propagates through a network and affects how the opinions of target population (collection of “agents”) change in relation to the topics in shared messages.
- Consists of thousands of agents who are initialised with a certain of set parameters (opinions and beliefs).
- **The process of selecting and initialising the parameters for any scenario needed improvements, that is where we came in.**

PROBLEMS IDENTIFIED



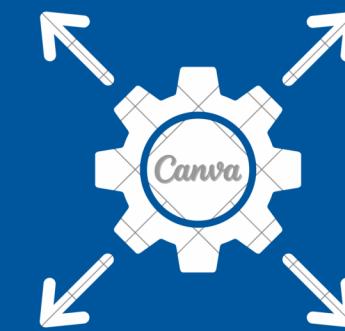
Manual Compilation

Lack of automation of data absorption from source files, that exist in different formats



Dispersed Data

Lack of a unified data model that supports efficient data storage, retrieval and analysis.



Difficult to Scale

Lack of an interface to facilitate quick turn around and ability to scale scenarios

SOLUTIONS PROVIDED

4 Scenario creation Interface

Provided an interface for creation of multiple scenarios simultaneously

3 Postgres Solution

Enabled autopopulation of postgres tables with data from multiple source files

2 Data Model Creation

Designed a normalized datamodel that facilitates querying and analysis

1 Meta data Parsing

Automated metadata capture from different source files to pandas dataframes

DEMO

CHALLENGES

We found challenges to be really helpful to navigate our way further!



- 01** LIMITED ACCESS
- 02** DATA INCONSISTENCIES
- 03** HIGH VOLUME DATA

RESULTS

Efficiently were able to solve the problem OF THE CLIENT



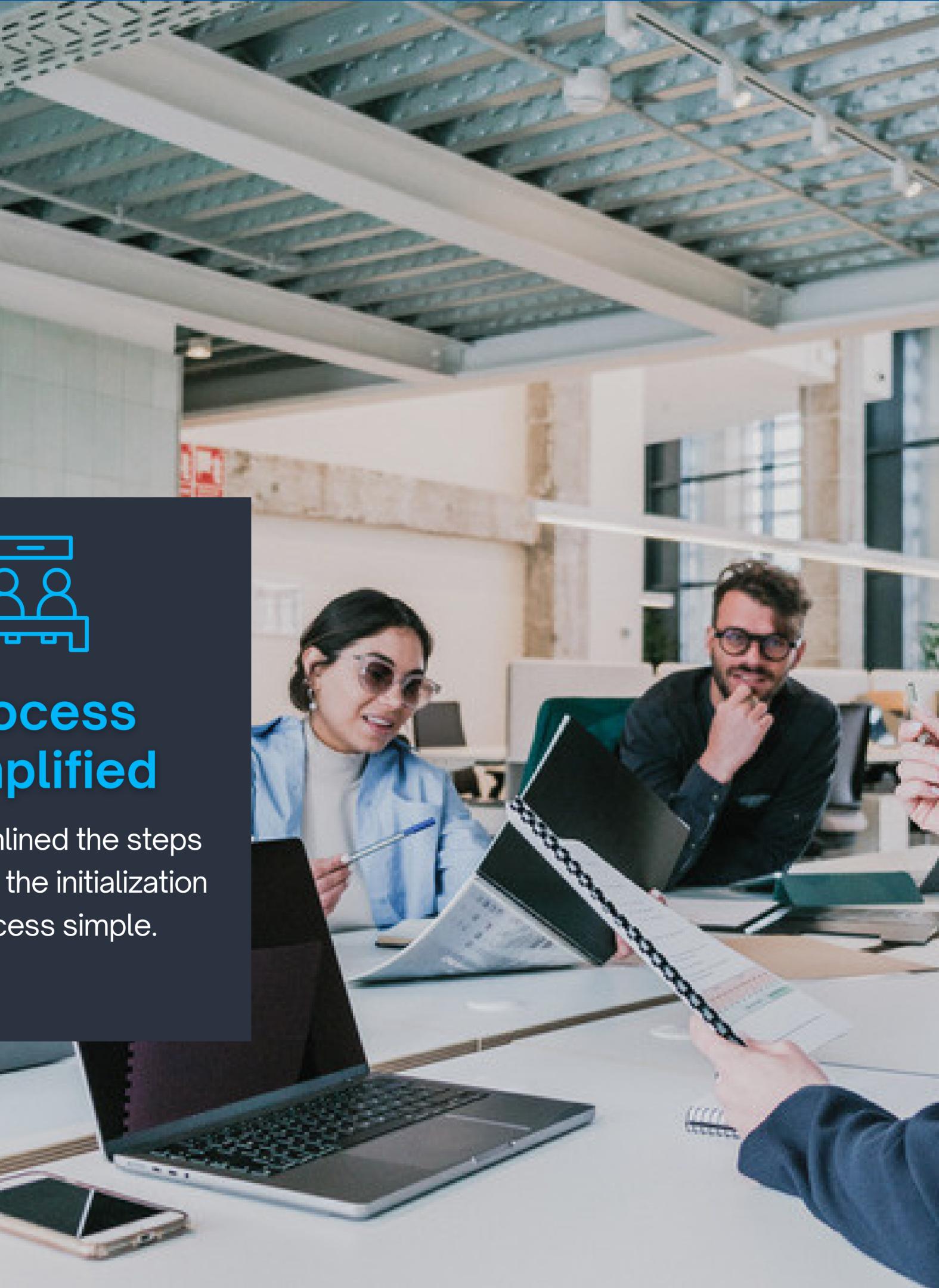
Time Savings

Simulator Initialization process velocity increased



Efficient Data Storage

Central Repository built where they will have ready access to all the data they might need for running future scenarios



ARLIS NEXT STEPS...

- Making an Intuitive Front-end to filter the data for data needs in the future Scenarios
- For now, data repository is for a particular region - Morocco. It should scaled to future needs. Code should be improved to support data ingestion from all data sources.
- Matured Data Model supporting other processes of ICS



THANK YOU



QUESTIONS?