Extreme Weather Conditions and Real-Time Alerting

Dimitris Kasseropoulos
Katerina Psallida

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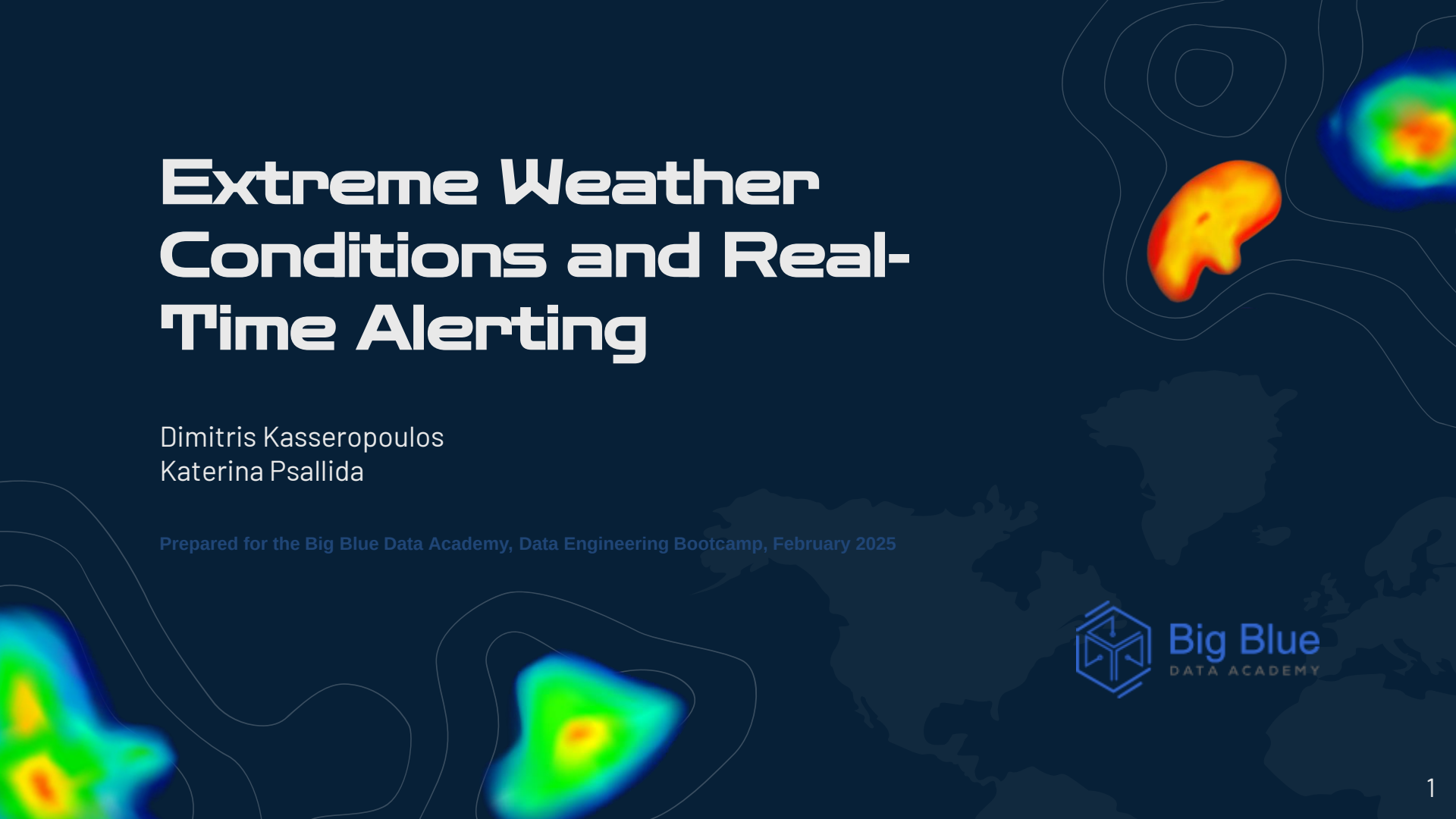


Big Blue
DATA ACADEMY

Who we are

Katerina Psallida

Work Experience

- Digital Sales for Data & AI Products
- Marketing Professional
- SAP Netweaver / Basis Technical Consultant

Studies

- Data Science Bootcamp
- Professional Diploma in Data Analytics
- MSc Computational Physics
- BSc Physics

Dimitris Kasseropoulos

Work Experience

- Data Engineer & Operations
- Operations Analyst

Studies

- MSc Data Science
- BSc Physics

The Agenda

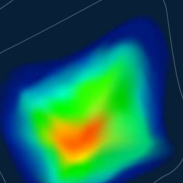
01 The Project Mission

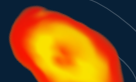
02 The Technologies implemented

03 The Methodology

04 The Results

05 The Conclusion & Future Work





01

The Project Mission

The Project Mission : Agriculture & Farming

Helping farmers make data-driven decisions—when to irrigate, when to harvest, and when to take preventive measures.

Providing real-time alerts for weather conditions (frost, heatwaves, heavy rainfall).

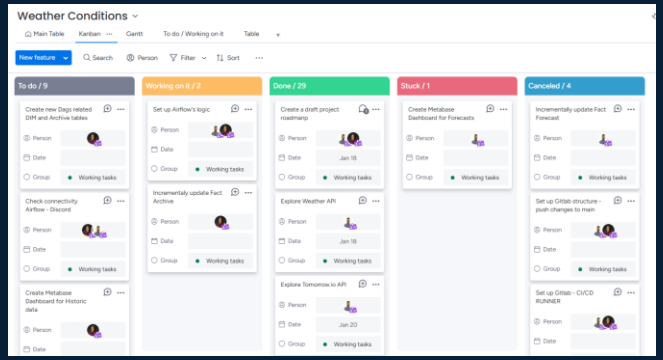
Analyzing historical weather patterns to predict risks and plan crop cycles efficiently.

02

The Technologies implemented

The technologies behind the project: Collaboration

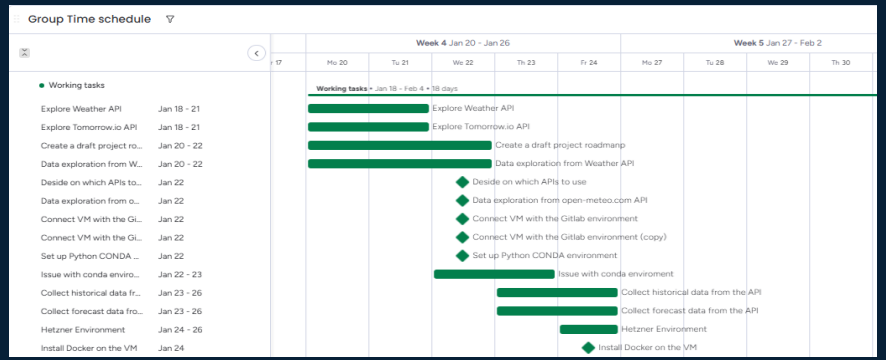
monday.com



Kanban Board

GitLab

Code Versioning



Gantt Chart

The Technologies behind the project

The Technologies implemented : APIs

Open-Meteo
Data since 1940 16 day ahead forecast

National Centers for Environmental Information
Information about the Weather Code

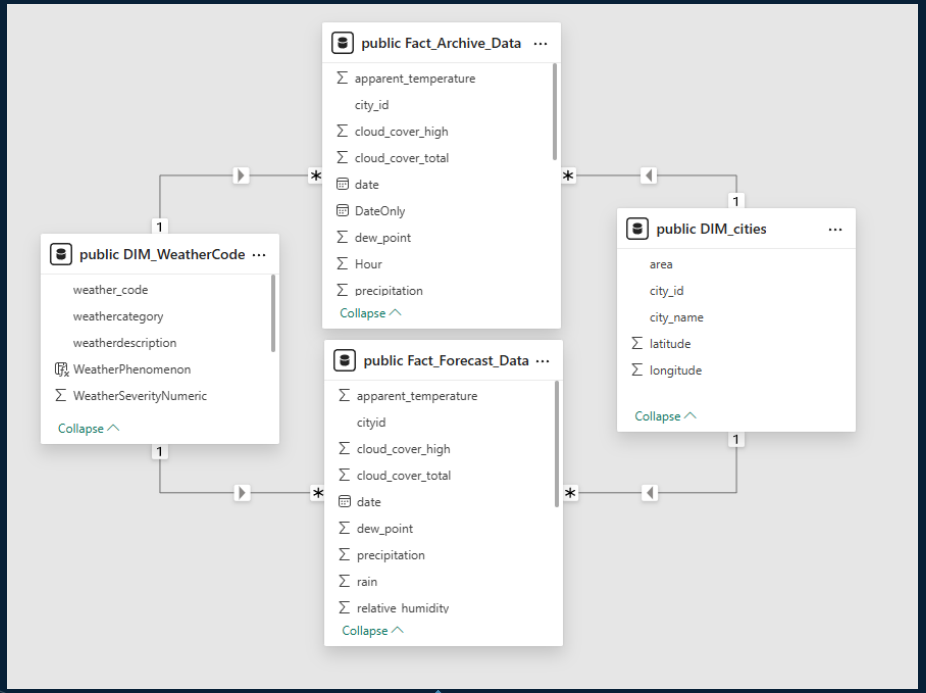
Nominatim
Find city coordinates with an easy to use API

01-01-2020 31-01-2025	25 Cities in Greece	28 weather codes	1.2 million Rows of Hourly Historical Data	10 K Forecast Records

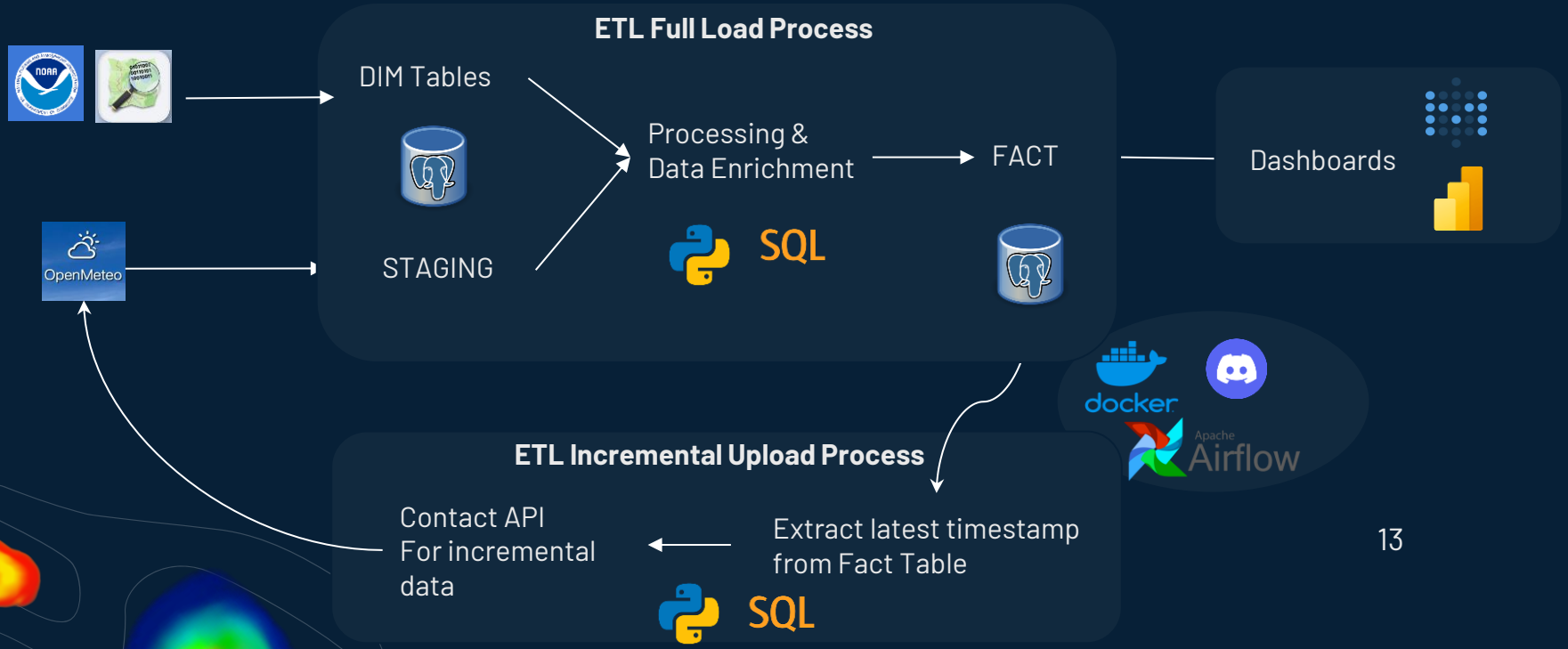
03

The methodology

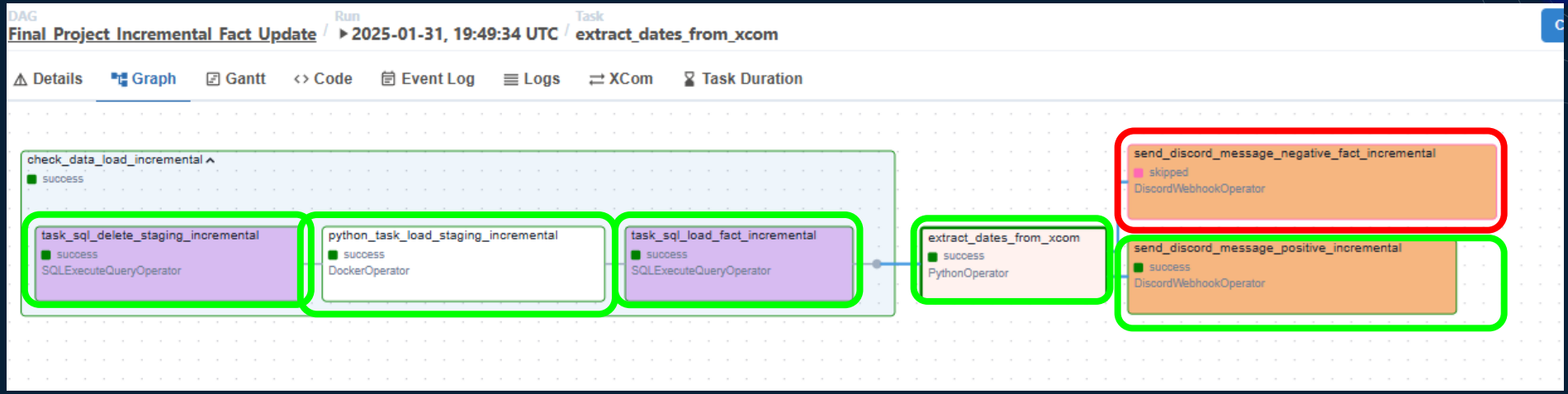
The Methodology: The data model



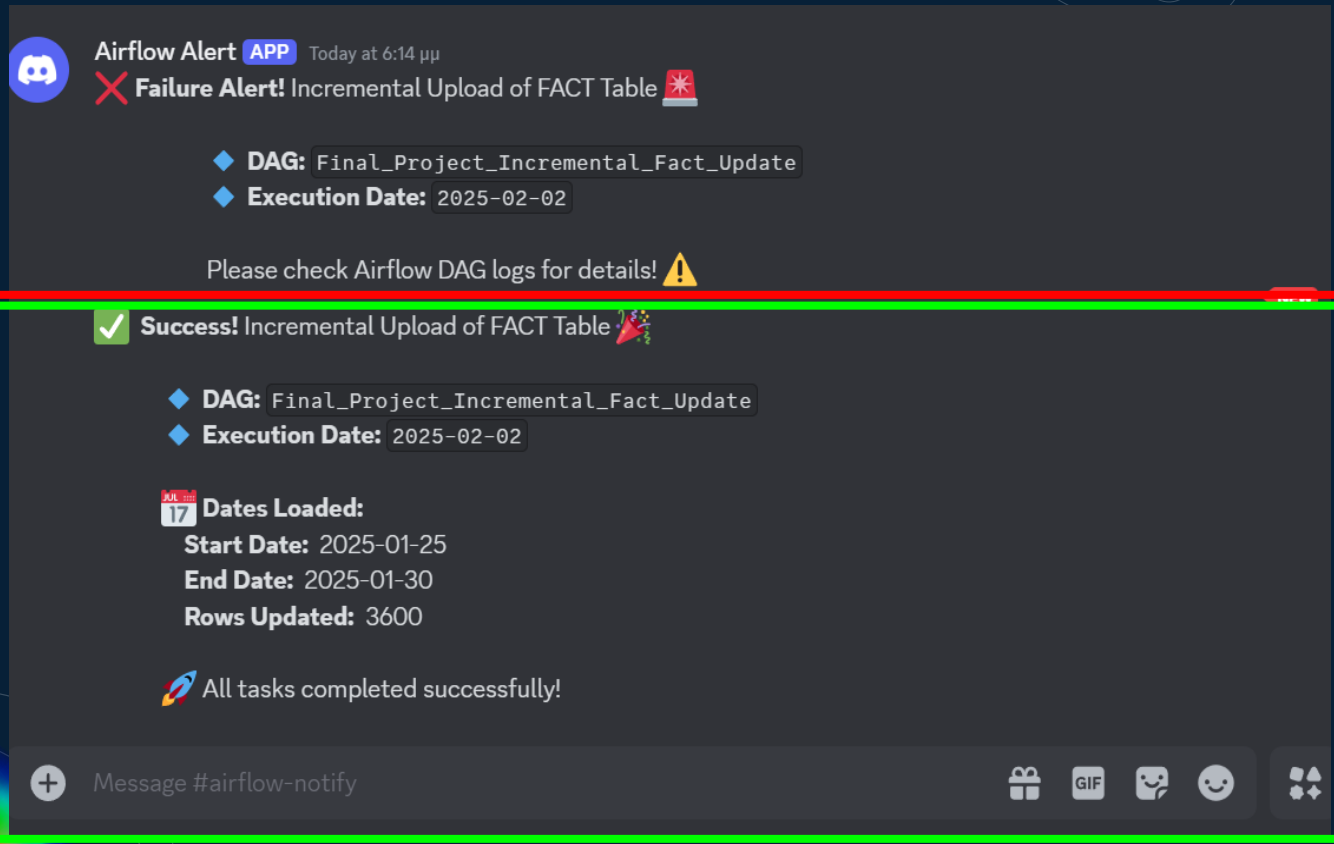
The methodology: The Data Flow for Historical Analysis



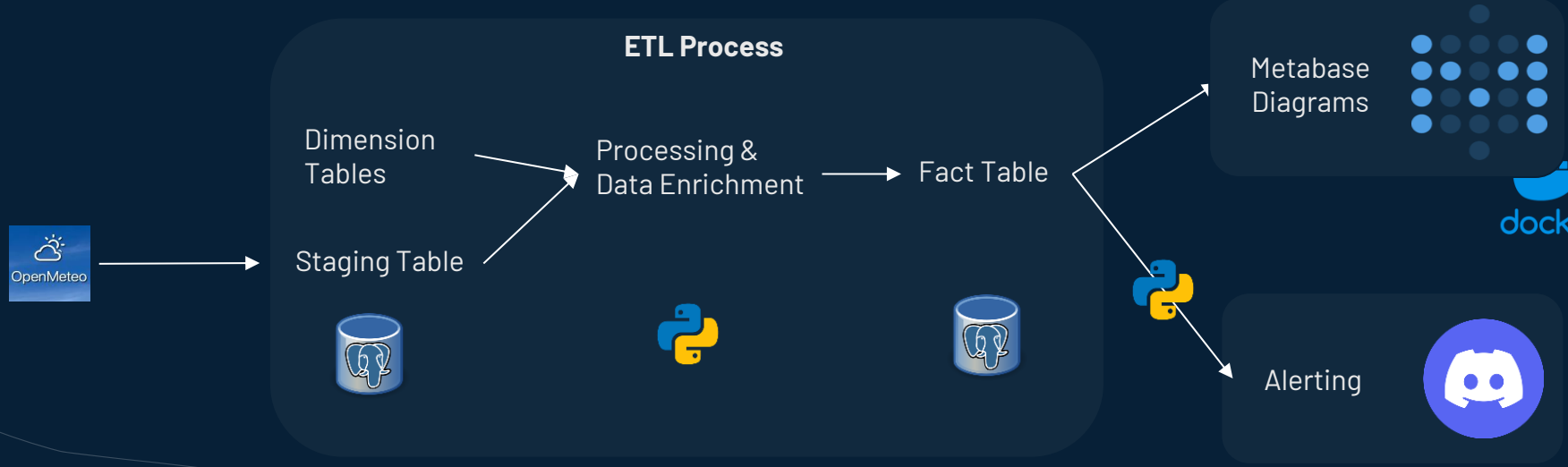
The methodology: AIRFLOW orchestration - Historical



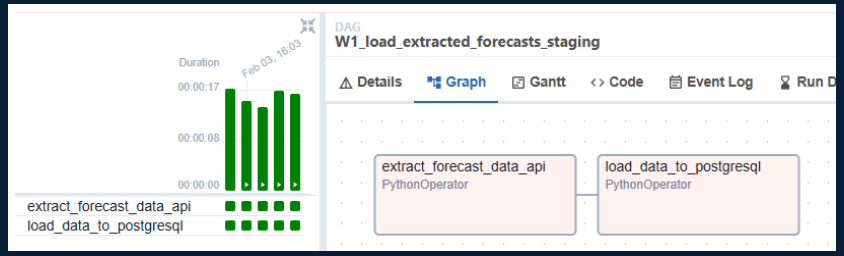
The methodology: AIRFLOW Load Alerts

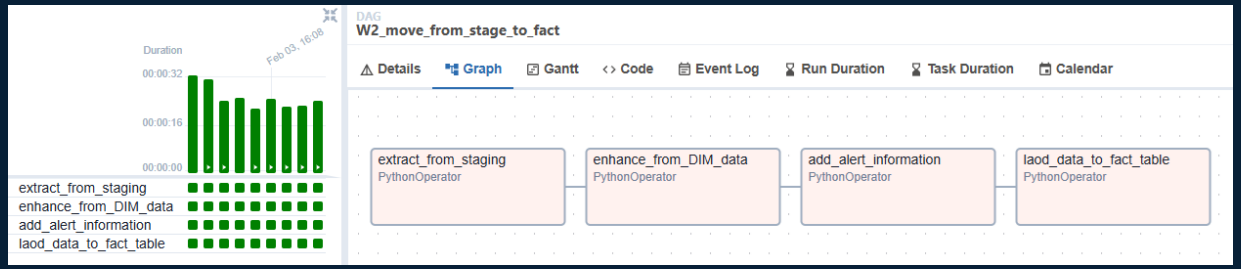


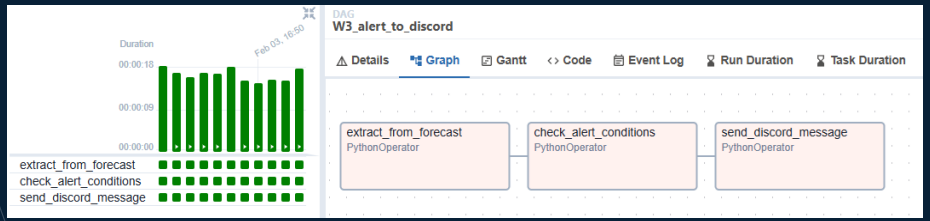
The methodology: Data Flow for Forecasting & Alerting



The methodology: AIRFLOW orchestration - Forecast







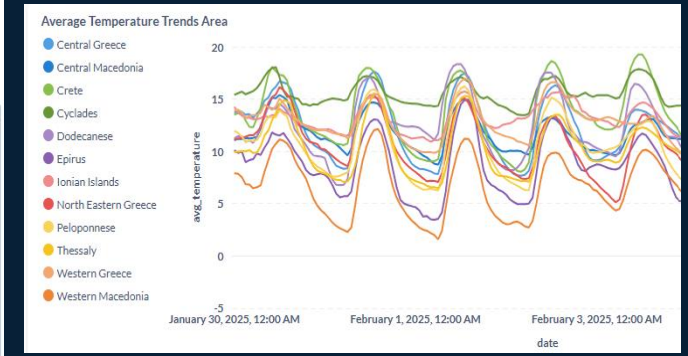
04

The Results

The Results

Power BI Dashboards

Metabase Diagrams



Metabase Link

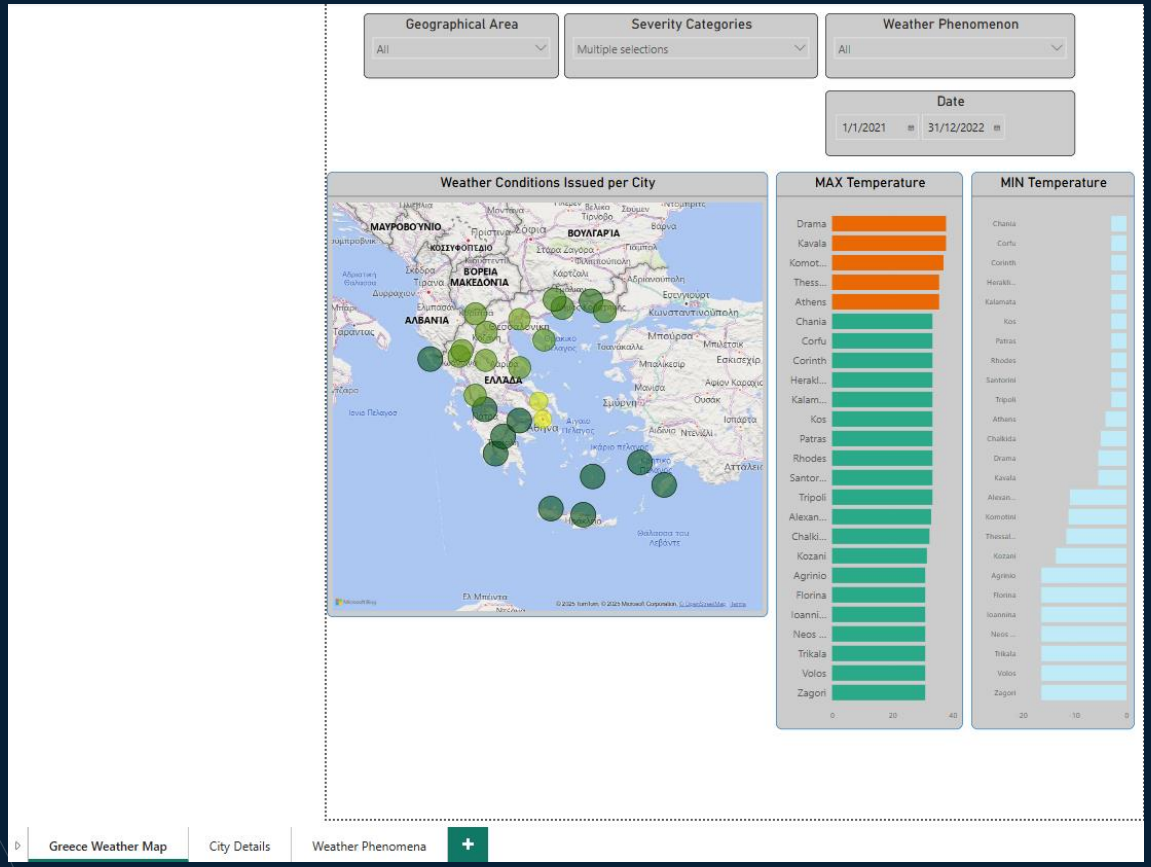
Discord Alert messages

The Alerts for the next 16 days

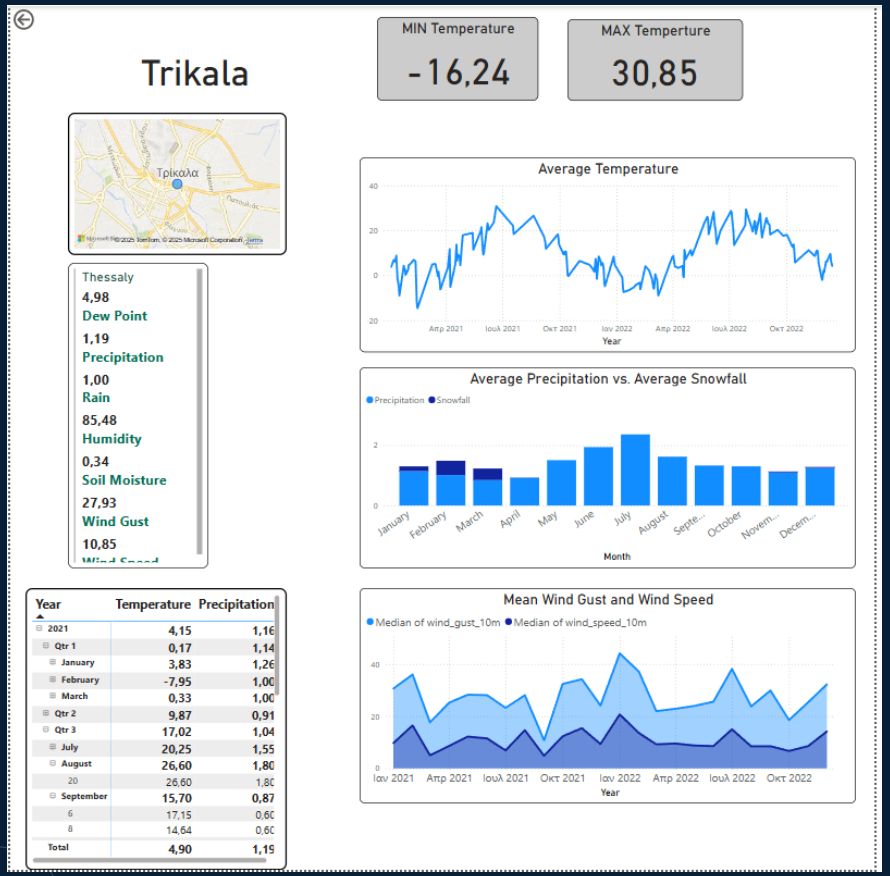
	city_name	date	type_of_alert	weathercategory
0	Agrinio	31/01/2025	cold	Minor
1	Alexandroupoli	03/02/2025	cold	Minor
2	Athens	31/01/2025	cold	Minor
3	Chalkida	31/01/2025	cold	Minor
4	Chania	13/02/2025	cold	Minor
5	Corfu	14/02/2025	cold	Minor
6	Corinth	13/02/2025	cold	Minor
7	Drama	31/01/2025	cold	Minor
8	Florina	31/01/2025	cold	Minor
9	Heraklion	12/02/2025	cold	Minor
10	Ioannina	31/01/2025	cold	Minor
11	Kalamata	31/01/2025	cold	Minor
12	Kavala	14/02/2025	cold	Minor
13	Komotini	13/02/2025	cold	Minor
14	Kozani	31/01/2025	cold	Minor
15	Patras	30/01/2025	cold	Minor
16	Rhodes	31/01/2025	cold	Minor
17	Thessaloniki	03/02/2025	cold	Minor
18	Trikala	05/02/2025	cold	Minor
19	Tripoli	31/01/2025	cold	Minor
20	Volos	31/01/2025	cold	Minor

Please visit link:http://4.231.126.217:3000/public/dashboard/b2d5d23c-75e7-413f-a8ca-d786bd8405b1 for more information

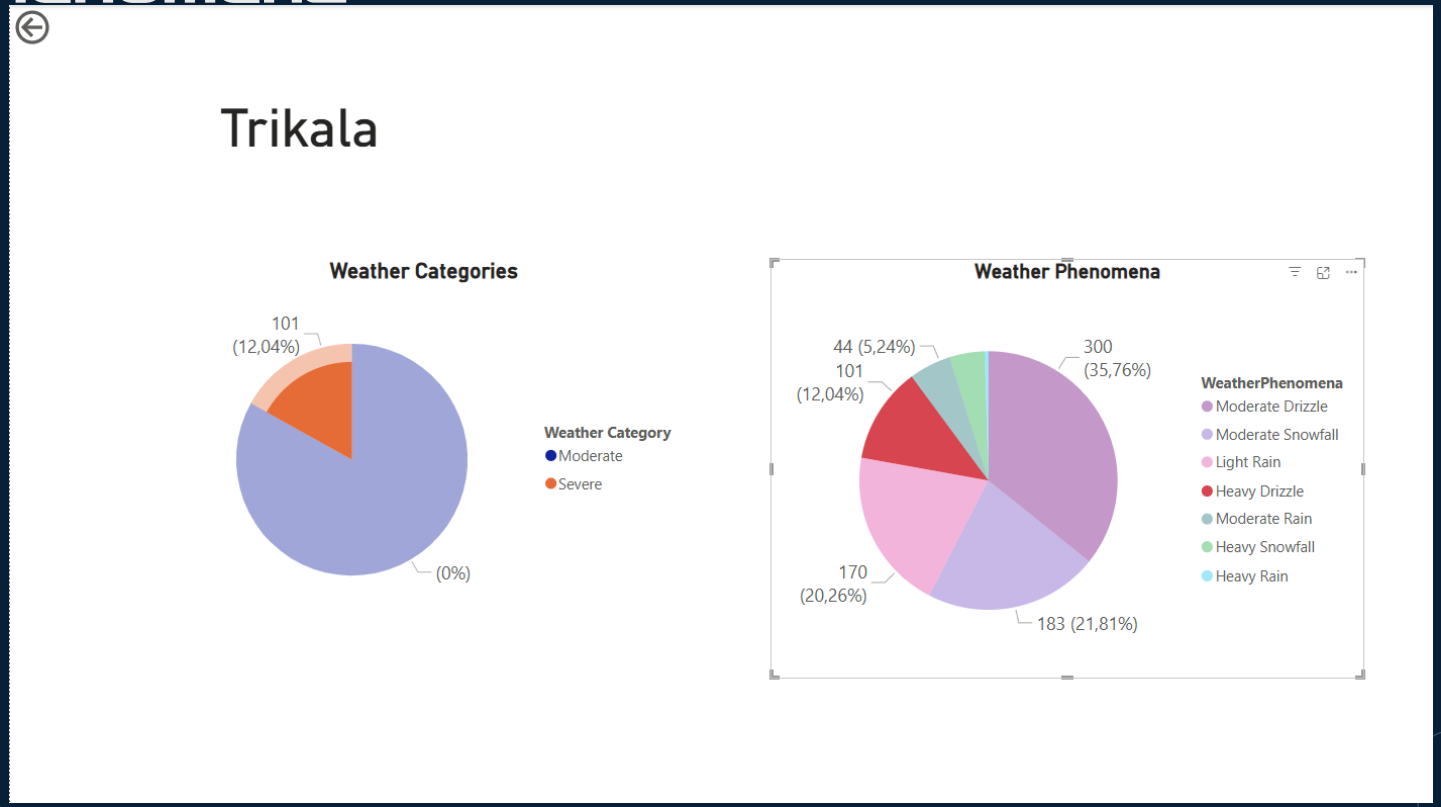
Power BI – Central Dashboard



Power BI – Drill Through "City Details"



Power BI – Drill Through "Weahter Phenomena"



05

The Conclusions and Future Work

The Conclusions & Future Work

- Utilize data from more sources
- Implement Email alerting
- Include more cities and rural areas in the model
- Design the architecture to be more scalable and automated
  - CI/CD
  - DAG triggering
- Incorporate more error handling scalability and fault tolerance

Θενξ !

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The methodology: Appendix