# Extreme Weather Conditions and Real-Time Alerting

Dimitris Kasseropoulos
Katerina Psallida

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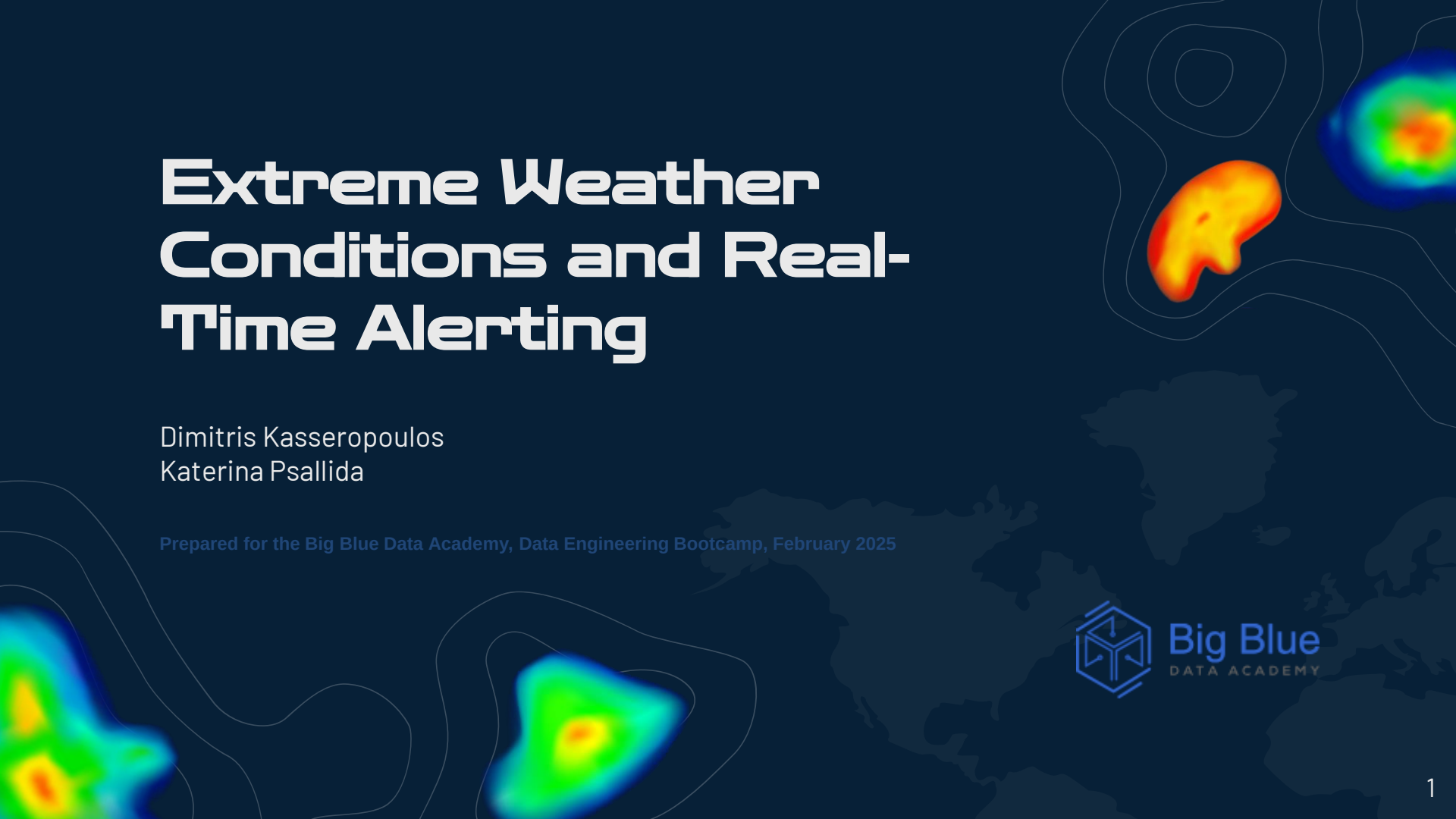


Big Blue
DATA ACADEMY

# 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

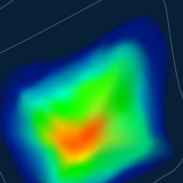
01 The Project Mission

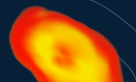
02 The Technologies implemented

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).

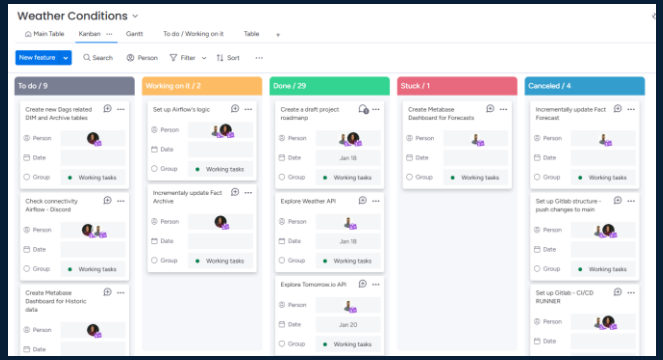
**Analyzing historical weather patterns** to predict risks and plan crop cycles efficiently.

# 02

# The Technologies implemented

# The technologies behind the project: Collaboration

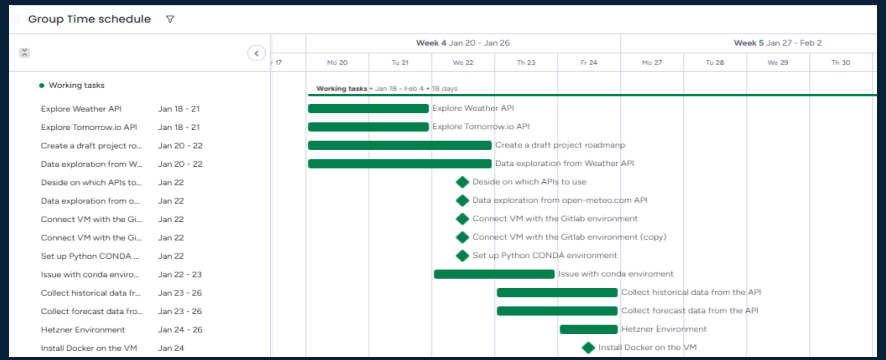
monday.com




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

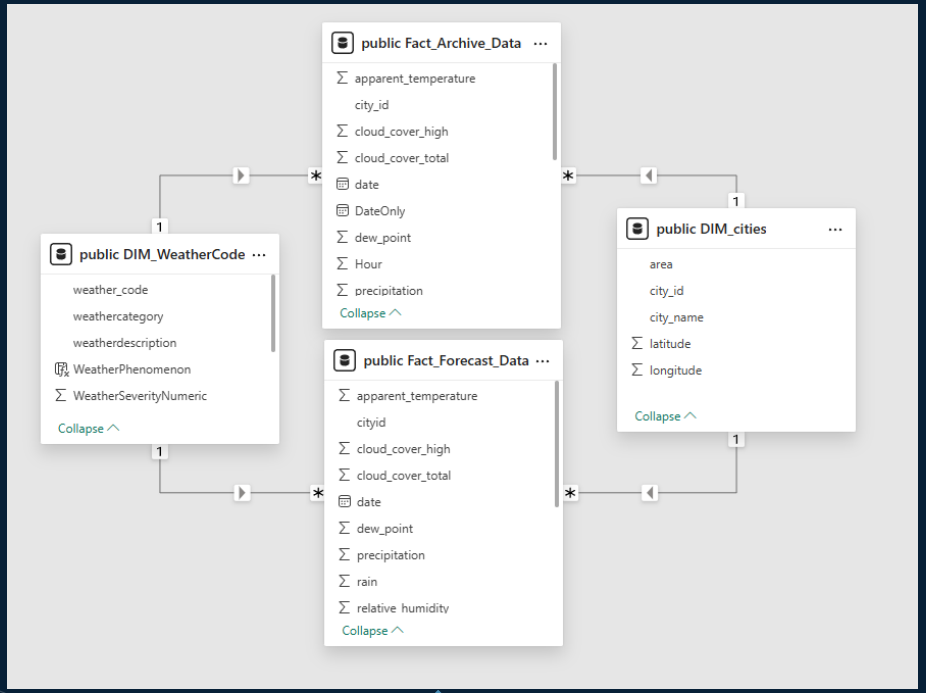
Nominatim
Find city coordinates with an easy to use API

| 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 |
|---|---|---|---|---|

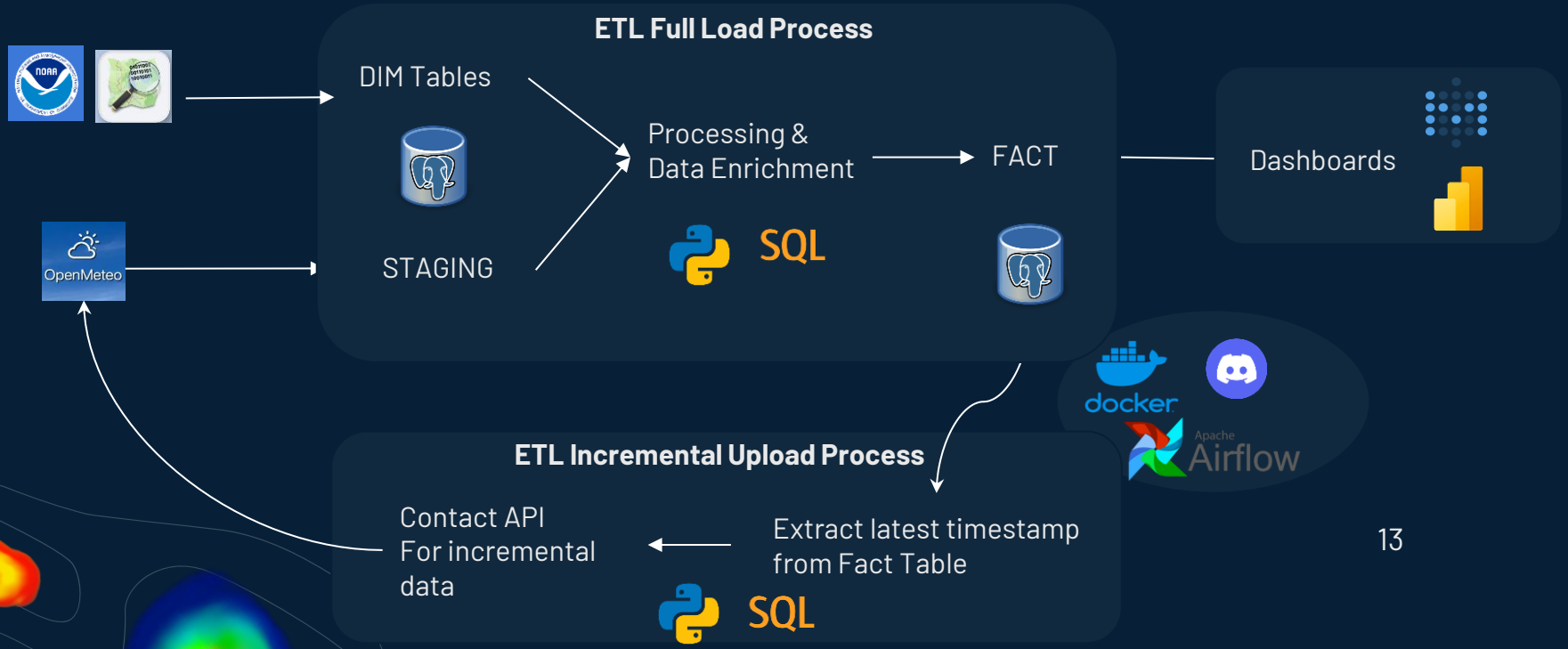
# 03

# The methodology

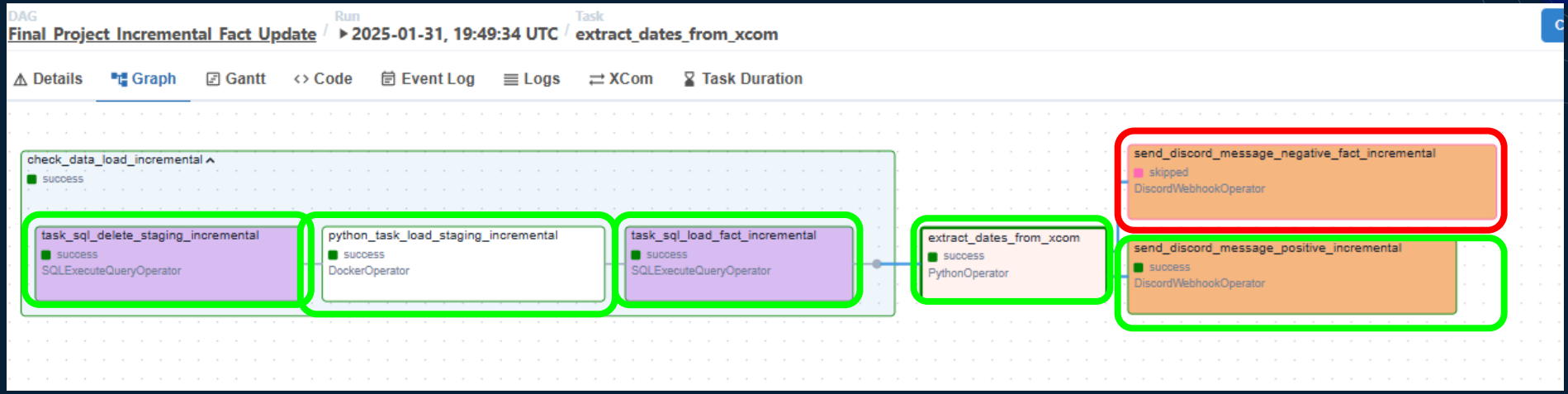
# The Methodology: The data model



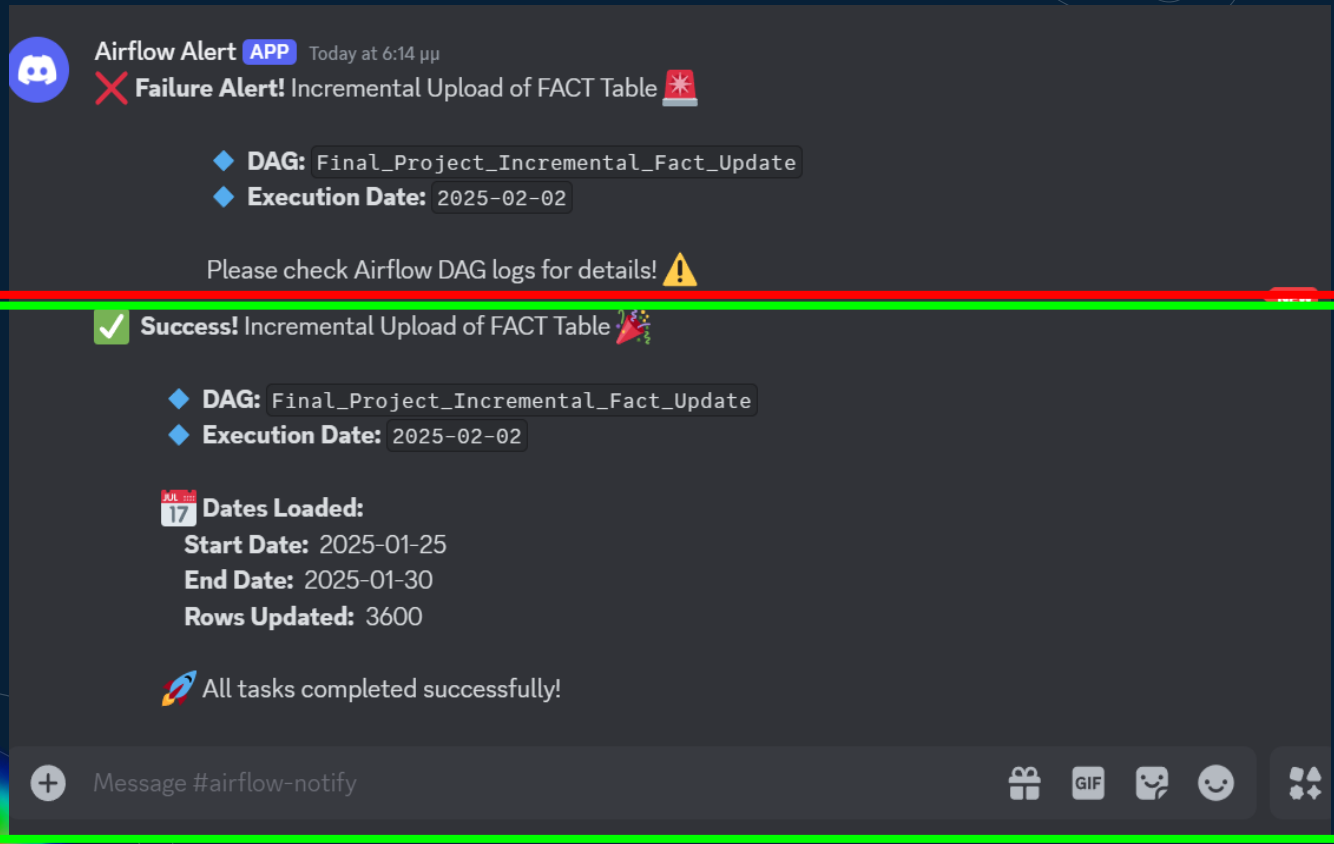
# The methodology: The Data Flow for Historical Analysis



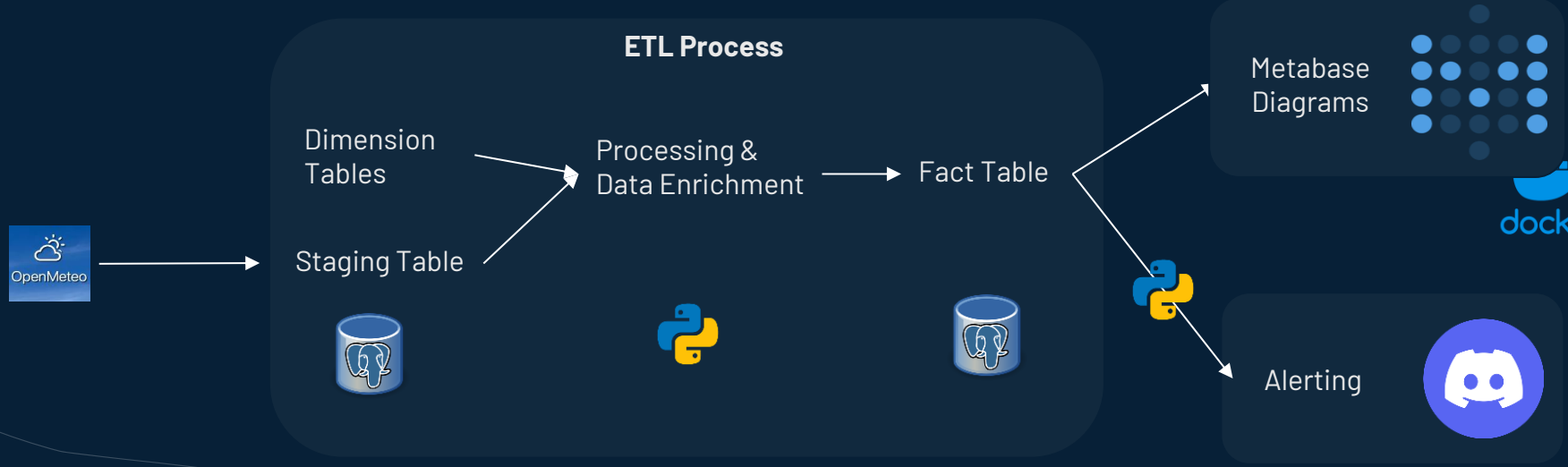
# The methodology: AIRFLOW orchestration - Historical



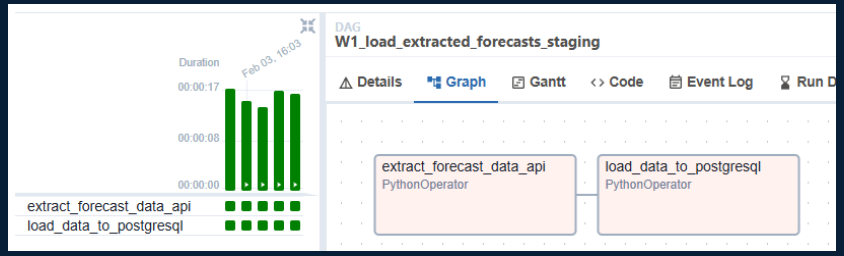
# The methodology: AIRFLOW Load Alerts

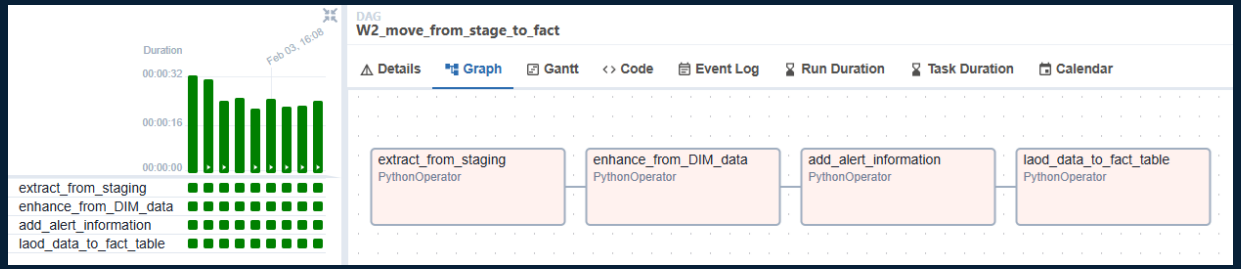


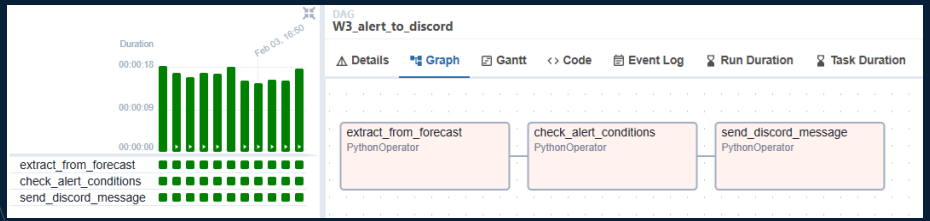
# The methodology: Data Flow for Forecasting & Alerting



# The methodology: AIRFLOW orchestration - Forecast



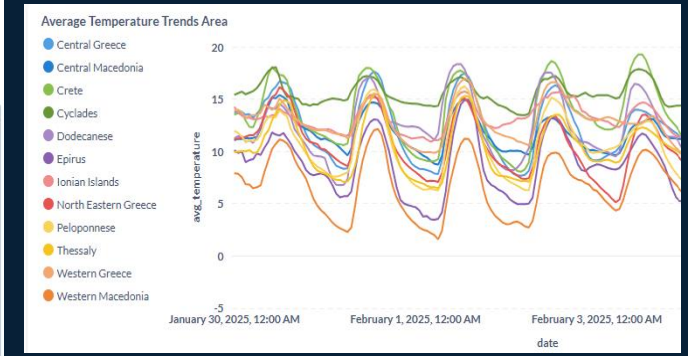
# 04

# 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

# 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