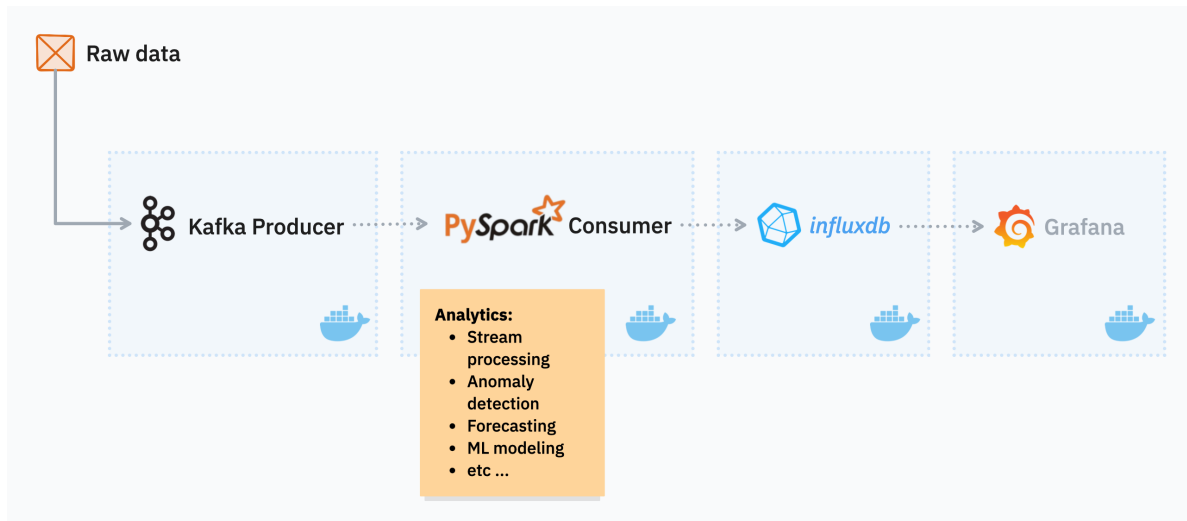


Assignment 1

System architecture diagram and team member responsibilities of **Team T5_AirQual_Mate**.

I. Architecture diagram



Raw data

Static file containing sensor measurements related to air quality.

Kafka producer

Reads the raw data file and streamlines the records into Kafka topics in their datetime order.

PySpark consumer

Listens to the streamlined data and creates mini batches to call analytical functions—such as Anomaly Detection and Forecasting—on this windowed data.

Influxdb

Data is then persisted in the database including the online predictions and the original incoming data.

Grafana

Dashboard visualization component that periodically fetches the database for new data to show the latest insights in real-time.

II. Team member responsibilities

Team member	Main responsibilities
Albazzal, Houmam	Containerization, Data Streamlining
Balogh, Máté	Anomaly Detection, Pipeline Integration
Földvári, Ádám	ML modeling, Forecasting
Lahmar, Abderraouf	Calculation and Combination of Statistics, Database
Nagy, Zsuzsanna	Dashboarding

Containerization

Creating standalone self-contained Docker containers for the elements depicted in the architecture diagram.

Data streamlining

Turning raw data into an ordered data flow, organized into Kafka topics.

Anomaly detection

Detecting sudden changes in sensor readings.

Pipeline integration

Overseeing and ensuring all the standalone components are compatible with each other.

ML modeling, forecasting

Preparing the incoming data, selecting applicable ML algorithms and making forecasts on future sensor readings, along with classification of air quality.

Statistics

Ensuring statistical functions are available at the online analytics phase, along with maintaining global estimations if necessary.

Database

Creating database schema, along with setting up connections to persist and to read data.

Dashboarding

Creating visualizations for forecasted sensor measurements and air quality classification, along with anomalies and the actual sensor readings.