Real-Time Network Performance Dashboard

Project Description

The aim of this project is to create a real-time dashboard for monitoring the performance of a mobile network. The system should display key performance indicators (KPIs) such as latency, throughput, and error rates.

The key Items to design and build are:

1. Performance Data Simulator. This publishes performance metrics to a Kafka topic. The data format message includes:
    a. Node id: integer
    b. Network id: integer
    c. Latency: double (ms)
    d. Throughput: double (Mbps)
    e. Error rate: double (%)
    f. Timestamp: datetime

2. Kafka Subscriber. This consumes performance data messages from the topic the data simulator publishes too and stores them in a database.

3. Real-Time Processing Module. This analyzes and processes the performance data for real-time insights.

4. REST Interface. Exposes the performance data in the database via a REST/JSON API.

5. User Interface. This displays real-time performance metrics on a dashboard using the REST interface to access the data. The data range should be selectable.

Technical Requirement

- Java Spring Boot for the simulator, subscriber, and REST interface.
- Kafka for messaging.
- Database for data storage.
- Web UI for visualization.
- Docker for packaging and deployment.
- SonarQube for code quality.
- Automated tests for Java code.
- Git repository for version control.

You are free to be creative in your solution and make assumptions too.

Hint

There is a lot of interfaces in the project: Kafka publisher to consumer, Rest API to user interface, Kafka publisher to REST API. Be careful to design these at the beginning and try not to change them after unless absolutely necessary.

Keep a running system as early as possible- so integrate your work frequently!