PV217 Service Oriented Architecture

QuarkIoT

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Intro

The goal of this project is to design and implement a distributed microservices-based platform using Quarkus for collecting, storing, and analyzing data from IoT devices and sensors.
The system should be able to receive real-time data streams (e.g., temperature, humidity, light intensity, motion, etc.) from a set of IoT devices, process and persist the data efficiently to keep historical data, and expose REST APIs for data access, analytics, and visualization.

Tech Stack

Programming language: Java 21

Framework: Quarkus 3.29.1

Message broker: Kafka 4.1.1

Database: PostgreSQL 16

Cache: Redis 7

Monitoring: Prometheus 3.0.0, Grafana 9.5.7

Containerization: Docker 28.5.0, Docker Compose 2.40.3

Other: locust 2.42.6, adminer, Kafka UI

Device Management Service

- Registers and manages IoT devices and their rules.

Data Ingestion Service

- Collects incoming sensor data
- Validates against device management service if sensor is registered
- Sends data to be processed by different service.

Data Processing Service

- Subscribes to event streams of incoming data.
- Enriches the data with metadata from device management service.
- Evaluates whether measurements are within healthy range
- Sends result data to analytics service.

Analytics Service

- Subscribes to processed data event stream.
- Persists the data.
- Analytics, and visualization

Live demo