Fachhochschule Kiel
University of Applied Sciences

Data Economy – Data Applications

Following is **Part 2** of the **Portfolio Examination** of the module **Data Economy** in **Summer Semester 2024**. Please **upload** your **documents** and **program files** to the corresponding course in **Moodle** Learn **latest until 20.06.2024 at 23:59**.

Data Pipeline

Based on Part 1 of the Portfolio Examination, please expand the existing Data Platform using FIWARE Technology for parking and weather data by implementing a (simulated) IoT Agent for water measurements and using NGSI-LD for communication and for the Smart Data Models due to the following guidelines:

1. Install, configure, and run the Docker images of the FIWARE Context Broker and the MongoDB database on your laptop.

2. Install, configure, and run the Docker images of FIWARE QuantumLeap and the CrateDB database on your laptop.

3. Adjust the existing Python program for simulating parking spots to use NGSI-LD instead of NGSI-V2 and run it as a Docker container.

4. Adjust the existing Python program for collecting weather data to use NGSI-LD instead of NGSI-V2 and run it as a Docker container.

5. Develop a Python program that creates the data model for water measurements using the corresponding Smart Data Models and NGSI-LD. At runtime the program should generate random data for at least 10 different measured variables in an interval of 5 seconds and update the corresponding properties in the Context Broker using NGSI-LD. The program should run as a Docker container.

6. Configure the Context Broker and QuantumLeap to use subscriptions for all data models so that new real-time data will automatically be stored in CrateDB via QuantumLeap as time series data.

7. Adjust the (PowerPoint) presentation about the IT architecture that contains information about the installation and configuration of the FIWARE components as well as the logical data flow between the different programs in the data platform. The representation of the data pipeline should already consider Grafana as the dashboard.

The **deliveries** are the presentation (as a PDF file) as well as the Python program file(s) or Jupyter notebook(s) including the Dockerfile(s).

Data Visualization

Please develop a dashboard using Grafana to visualize the real-time data and the time series data from the CrateDB database due to the following guidelines:

1. Install, configure, and run the Docker image of Grafana on your laptop.
2. Log in to Grafana using a Web Browser and configure the CrateDB database as a data source.
3. Create a new dashboard and configure appropriate panels for the visualization of the time series data of the parking lots, the weather data, and the water measurements.
4. Add a map panel to the dashboard and use markers for the locations of the different data models.
5. Prepare a (Word) documentation that contains at least information about the setup to run Grafana, the configuration of the dashboard, and some sample output.

The **deliveries** are the documentation (as a PDF file).

Data Platform

Please prepare a **presentation of 10 minutes** about the Data Platform that you have developed in Part 2 of the Portfolio Examination to be held **in person** on **19.06.2024 at 08:30** in the lecture at university. Consider the following content for your presentation:

1. What does the IT architecture of the data platform look like?
2. Which FIWARE components are used? Which application programs have been developed?
3. Which Smart Data Models and Interfaces are used? How does the data flow look like?
4. Demonstrate your Python code and the Grafana dashboard in detail.

The **deliveries** are the presentation (as a PDF file).