CleanStormWater

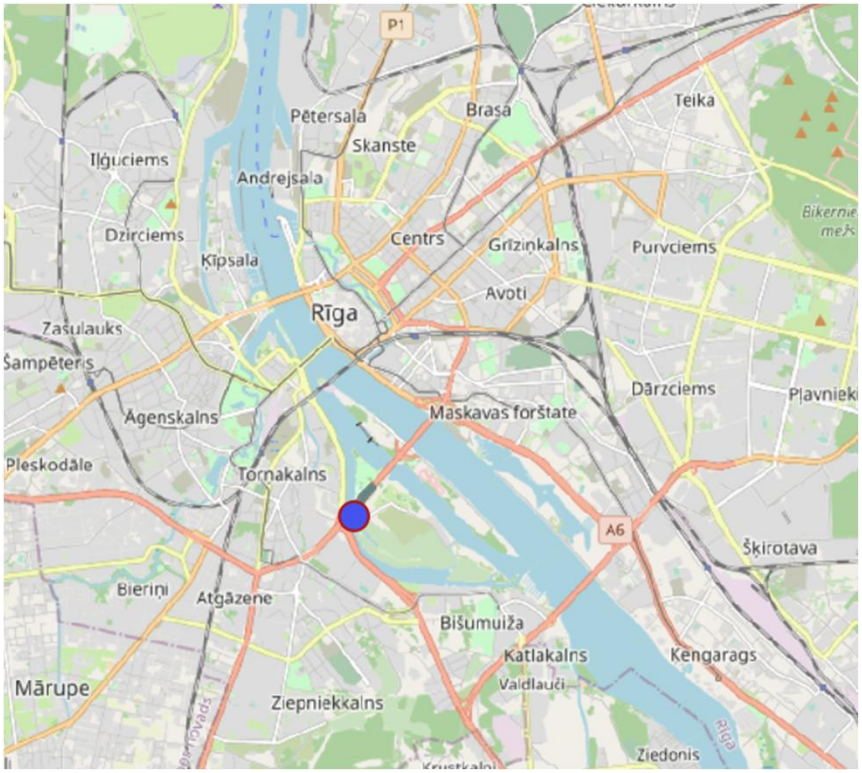
DIGITIZATION OF STORMWATER MANAGEMENT SYSTEM, INCL. MONITORING OF WATER QUALITY

MĀRA REČA | CITY OF RIGA

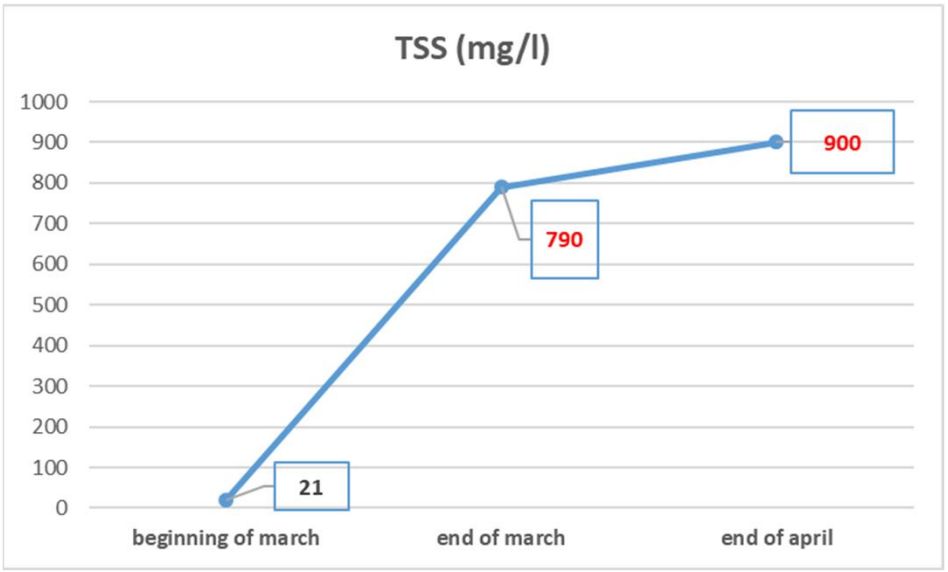
10.11.2022.

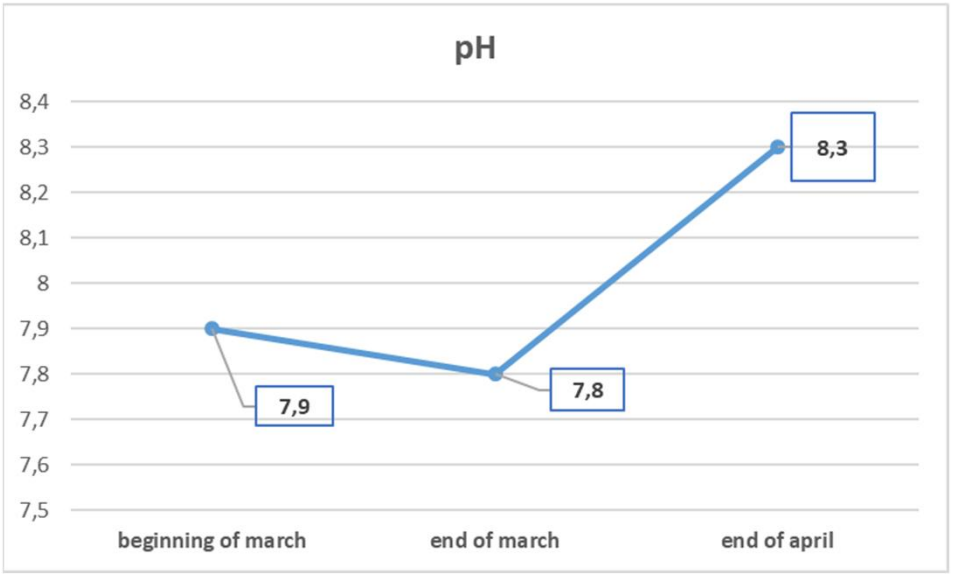
PILOT SITE

Pilot site
Catchment basin (1.87 ha)
OSM Standard


P1
Pētersala
Brasa
Teika
Skanste
Ilģuciems
Andrejsala
Dzirciems
Centrs
Grīziņkalns
Purvciems
Kīpsala
Avoti
Rīga
Zasulauks
Šampēteris
Dārzciems
Agenskalns
Maskavas forštate
Pleskodāle
Tornakalns
A6
Škirotava
Bieriņi
Atgāzene
Bišumuiža
Katlakalns
Kengarags
Mārupe
Valdlauči
Ziepniekkalns
Ziedonis

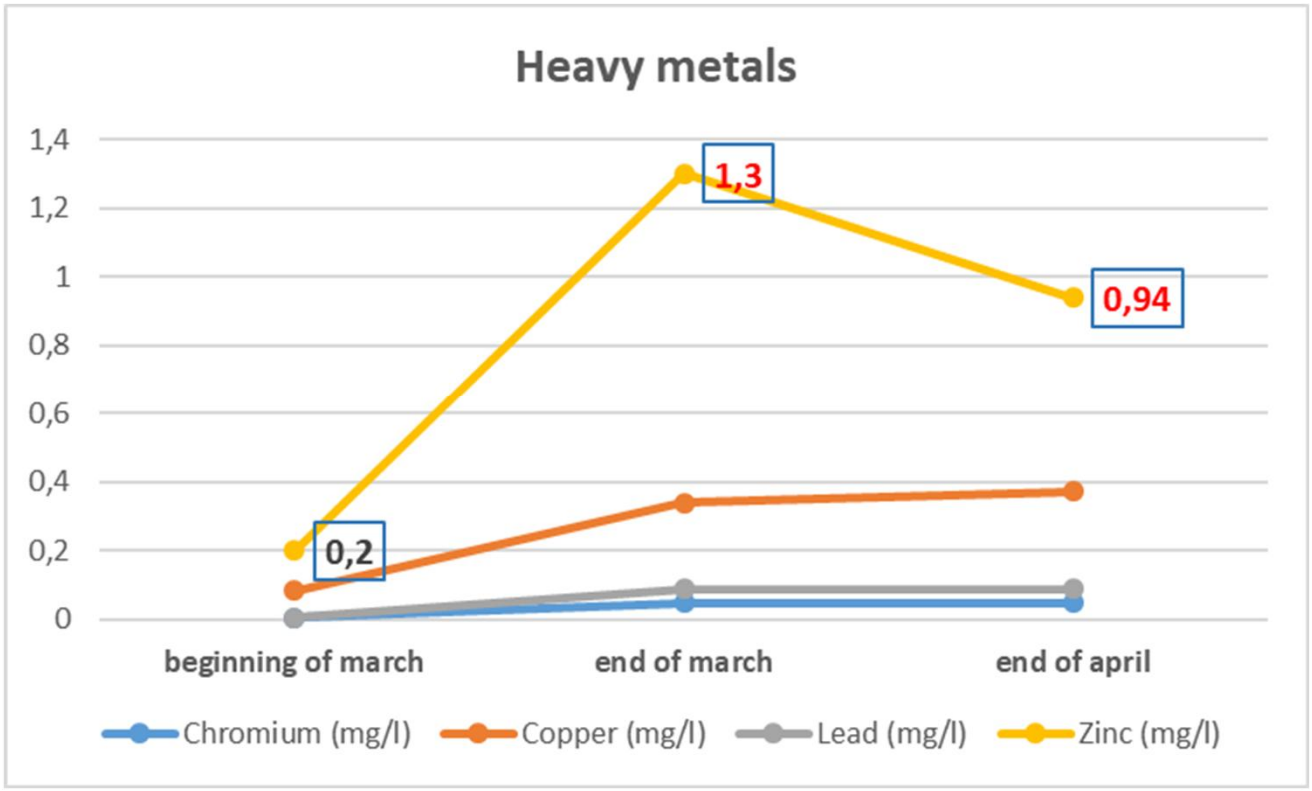
STORMWATER QUALITY IN PILOT I





- *Composition of wastewater discharged into the sewerage system of the city of Riga/ MK No 17 (Limit for TSS 450 mg/l)*

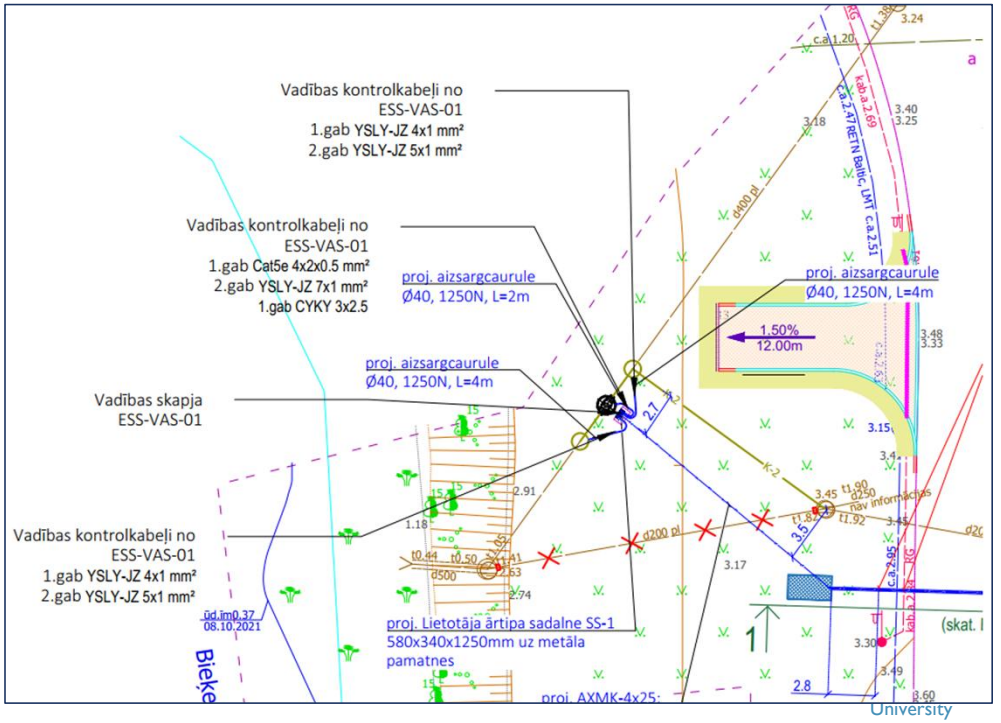
STORMWATER QUALITY IN PILOT II



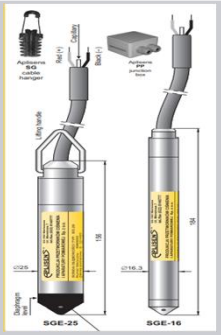
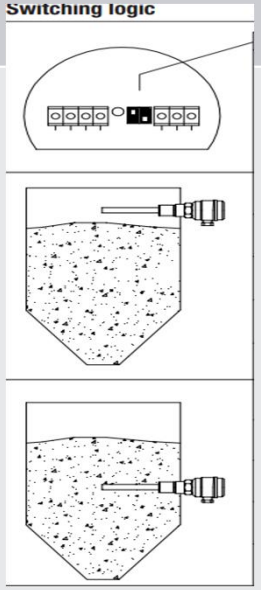
Composition of wastewater discharged into the sewerage system of the city of Riga/ MK No 17 (Limit for Zn 0,30 mg/l)

SENSORS FOR WASTEWATER MEASUREMENT

- Well K2-1
  - Temperature sensor
  - Ph sensor
  - Pressure sensor
  - Inflow control sensor
- Well K2-2
  - Temperature sensor
  - Pressure sensor
  - Inflow control sensor
- Well with a separator
  - Pressure sensor



SENSORS IN PILOT

Temperature	pH	Water level in well	Flow control	Level of TSS
ET20X series	DFROBOT	SHR-1-N: stainless steel sensor	Hydrostatic level probes SGE-25	Vibranivo ®
Measuring temperatore from -50 to +500 C	Measuring range: 0...10pH	Operating temperature: -25 °C to +60 °C	Any measurement range from 1 up to 500 m H2O	
				

Riga City Council

1862
RIGA TECHNICAL UNIVERSITY

Clean Storm Water

E-Monitoring in Riga

Development of E-Monitoring System for Rainwater Treatment Solution

Arnis Lektauers
Assoc. Professor, Senior Researcher, Dr.sc.ing.

DEVELOPMENT OF E-MONITORING SYSTEM FOR STORMWATER TREATMENT SOLUTION

Riga City Council

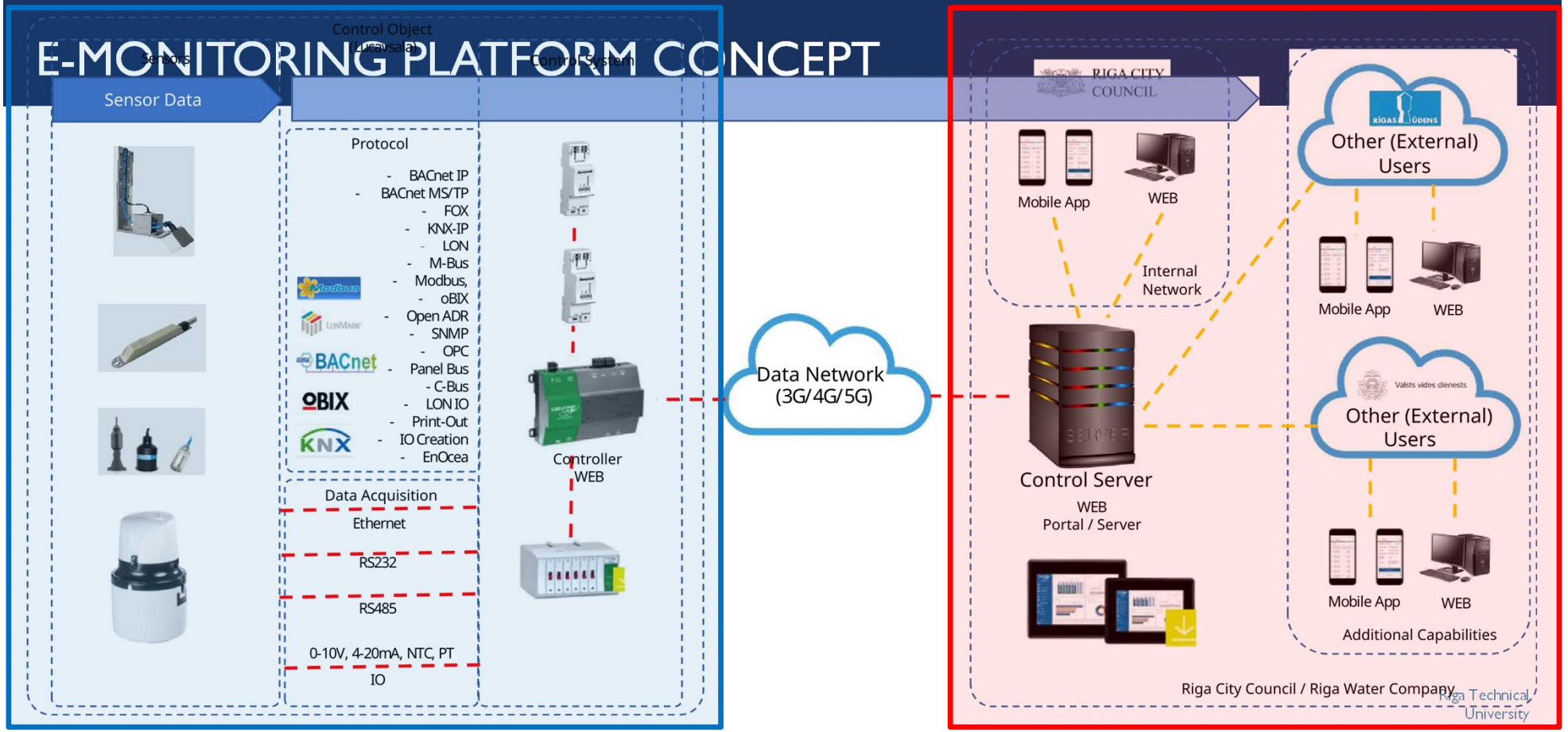
- Service Contract with Riga technical university for «*Development of an E-Monitoring System for a Rainwater Treatment Solution in Lucavsala, Mūkusala Roundabout*»
  - Project «Testing New Storm Water Treatment Solutions for Reduction of Hazardous Substances and Toxins Inflows into the Baltic Sea»
- **The goal**
  - To develop a storm water quality e-monitoring system for the rainwater treatment solution installed in Lucavsala, with the possibility of adding other control points equipped with sensors to the system in the future

Riga Technical University

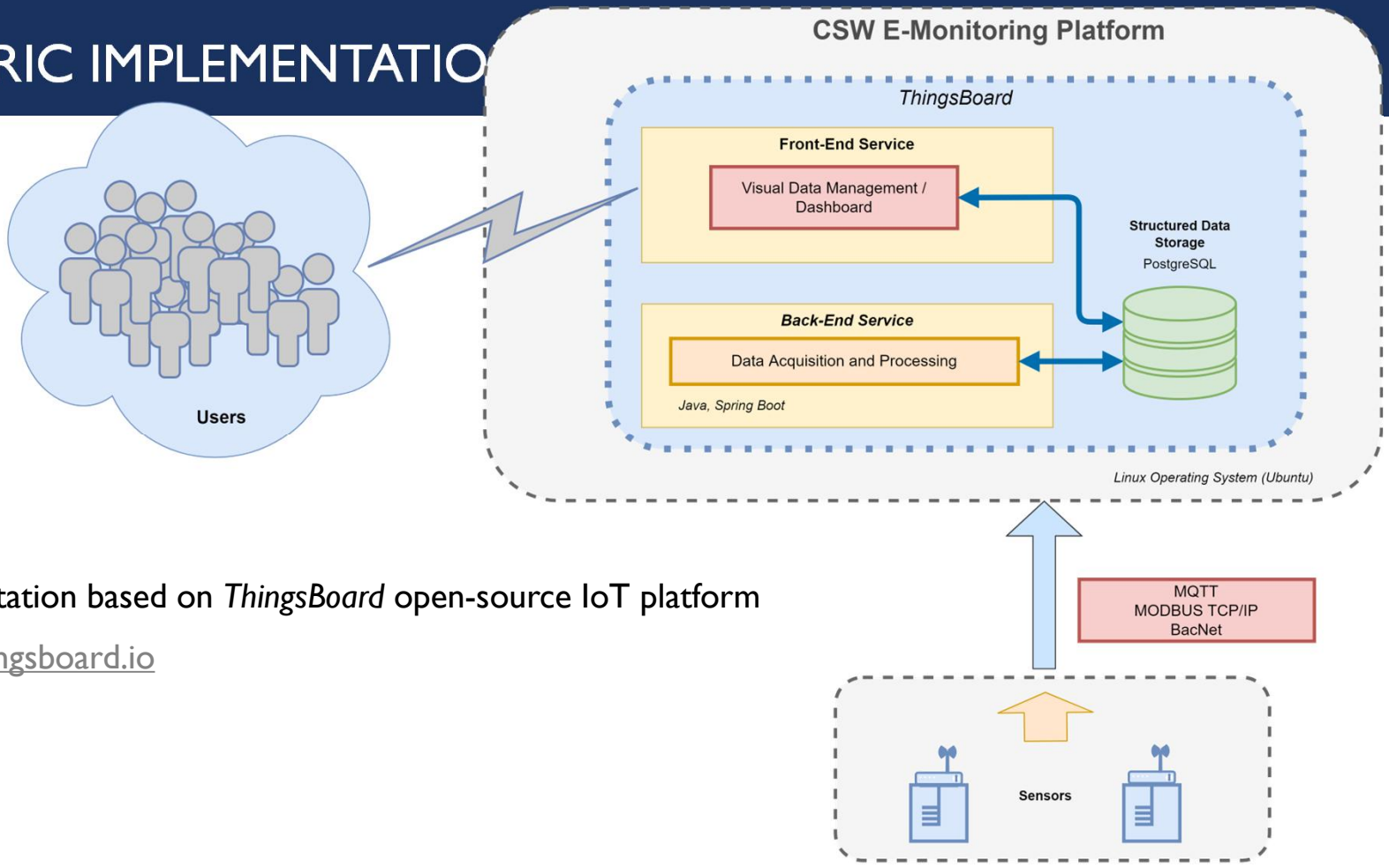
TASKS

1. Provide continuous collection of information from sensors and related systems using API (*Application Programming Interface*)
2. Support the possibility of importing and exporting information related to the object, as well as the possibility of exporting measurement results in a readable format (for example, PDF, excel)
3. Provide an opportunity for system users to view objects and their metadata, as well as monitor measurement results online
4. Offer users the opportunity to analyze measurement results, for example viewing data in graphical form for different reporting periods
5. Based on measurement results, generate warnings about overflow risks and the need for management actions

E-MONITORING PLATFORM CONCEPT



GENERIC IMPLEMENTATIO

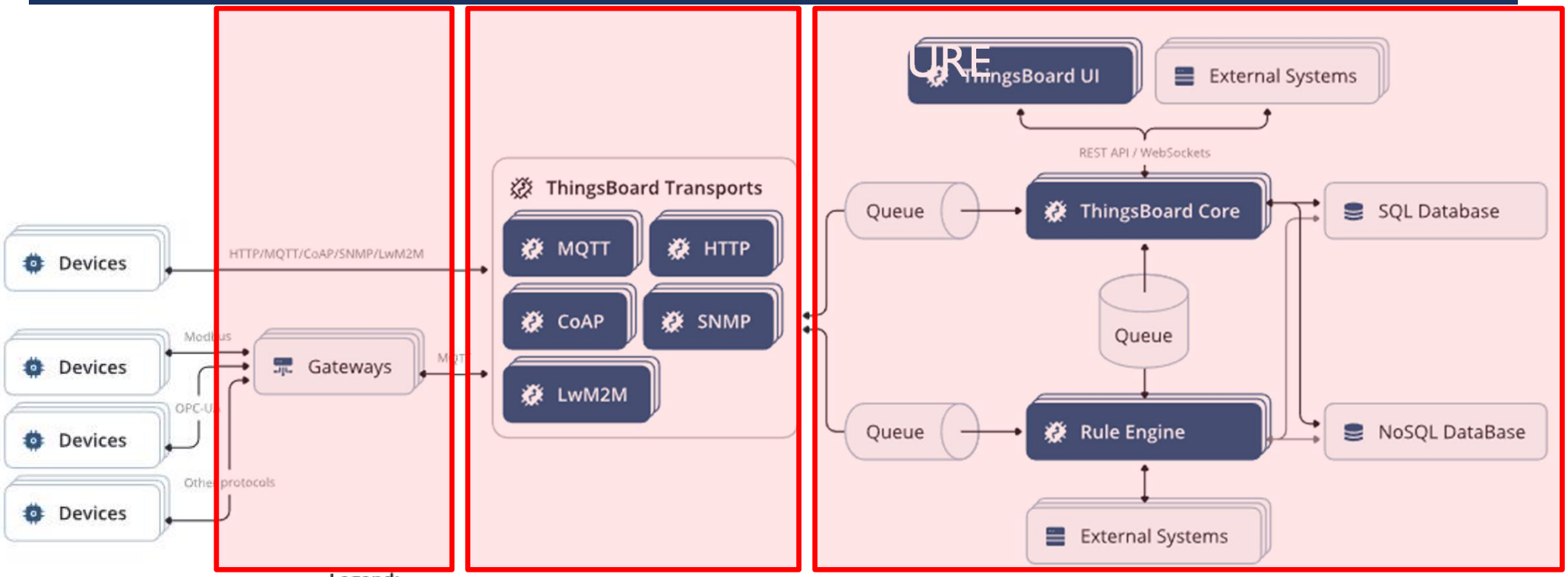


Implementation based on *ThingsBoard* open-source IoT platform

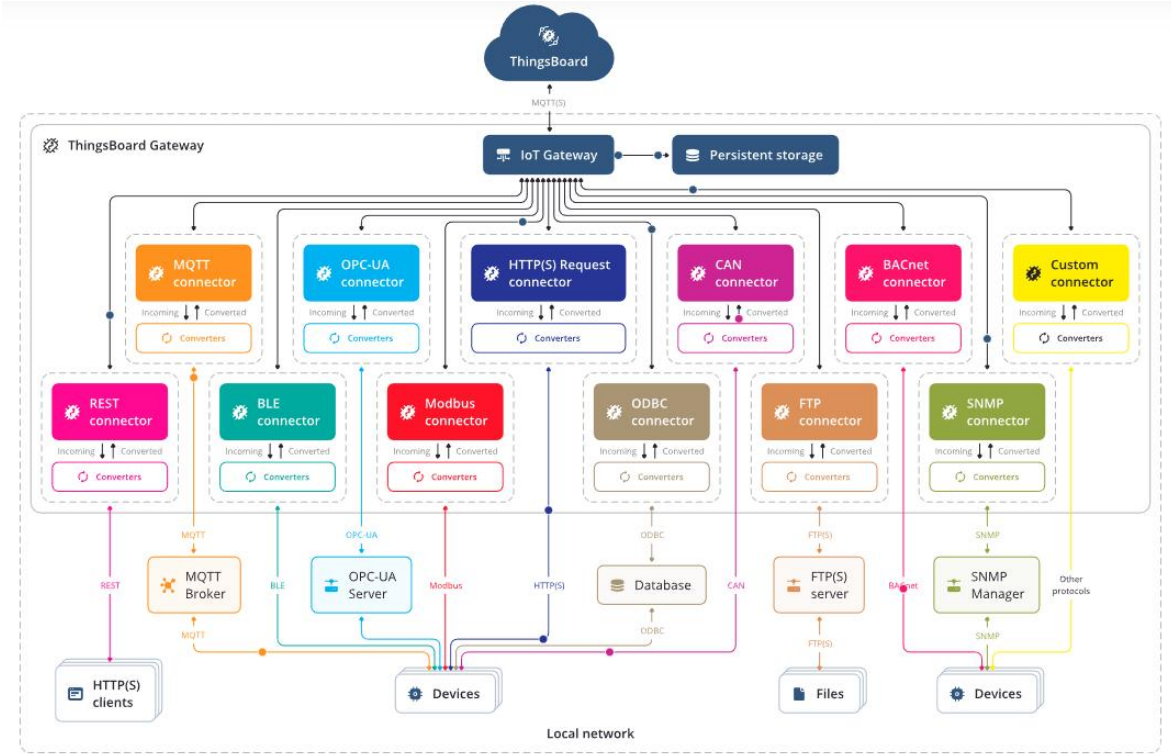
https://thingsboard.io

THINGSBOARD

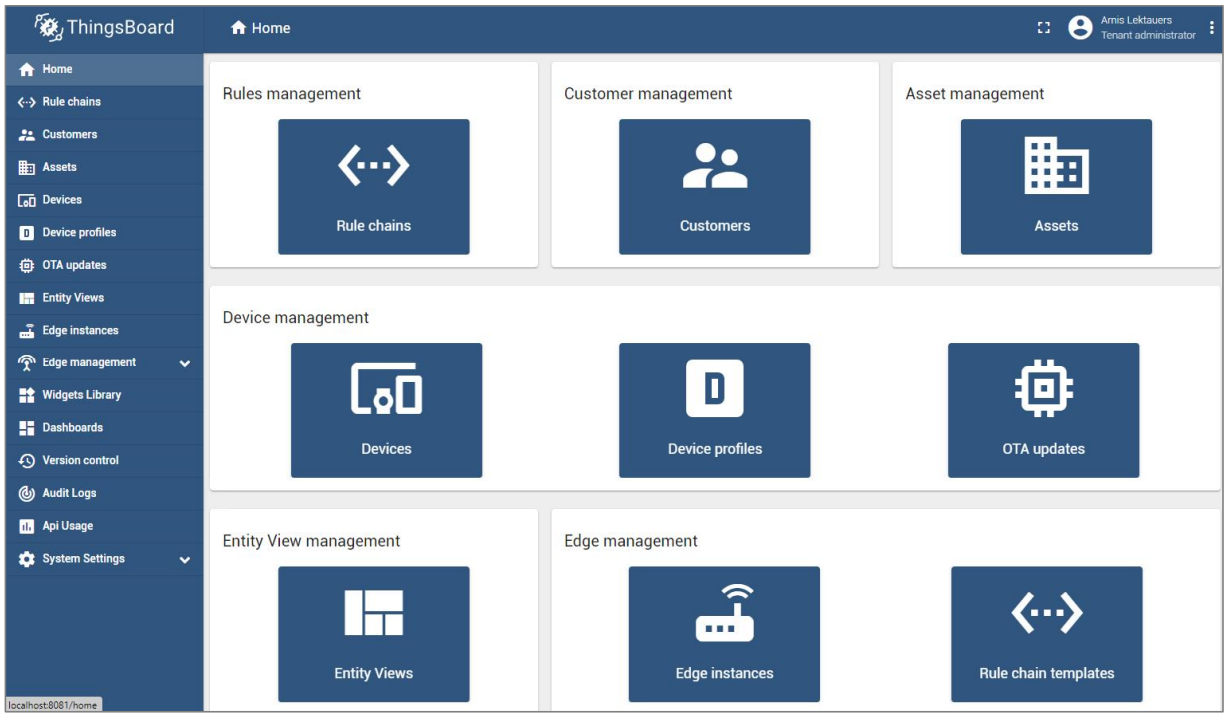
- **ThingsBoard** is an open-source IoT platform that enables rapid development, management, and scaling of IoT projects
  - Providing the out-of-the-box IoT cloud or on-premises solution enabling server-side infrastructure for IoT application
- **Main Features**
  - Collect and visualize data from devices and assets
  - Analyze incoming telemetry and trigger alarms with complex event processing
  - Design dynamic and responsive dashboards and present device or asset telemetry and insights to your customers.
  - Enable use-case specific features using customizable rule chains


URE
ThingsBoard UI
External Systems
REST API / WebSockets
ThingsBoard Transports
MQTT
HTTP
CoAP
SNMP
LwM2M
Queue
ThingsBoard Core
SQL Database
Queue
Queue
Rule Engine
NoSQL DataBase
External Systems
Devices
Devices
Devices
Devices
HTTP/MQTT/CoAP/SNMP/LwM2M
Modbus
OPC-UA
Other protocols
Gateways
MQTT
Legend:
- ThingsBoard Components: horizontally scalable and fault tolerant
- Message Queue: Kafka, RabbitMQ, AWS SQS, Azure Service Bus, Google Pub/Sub

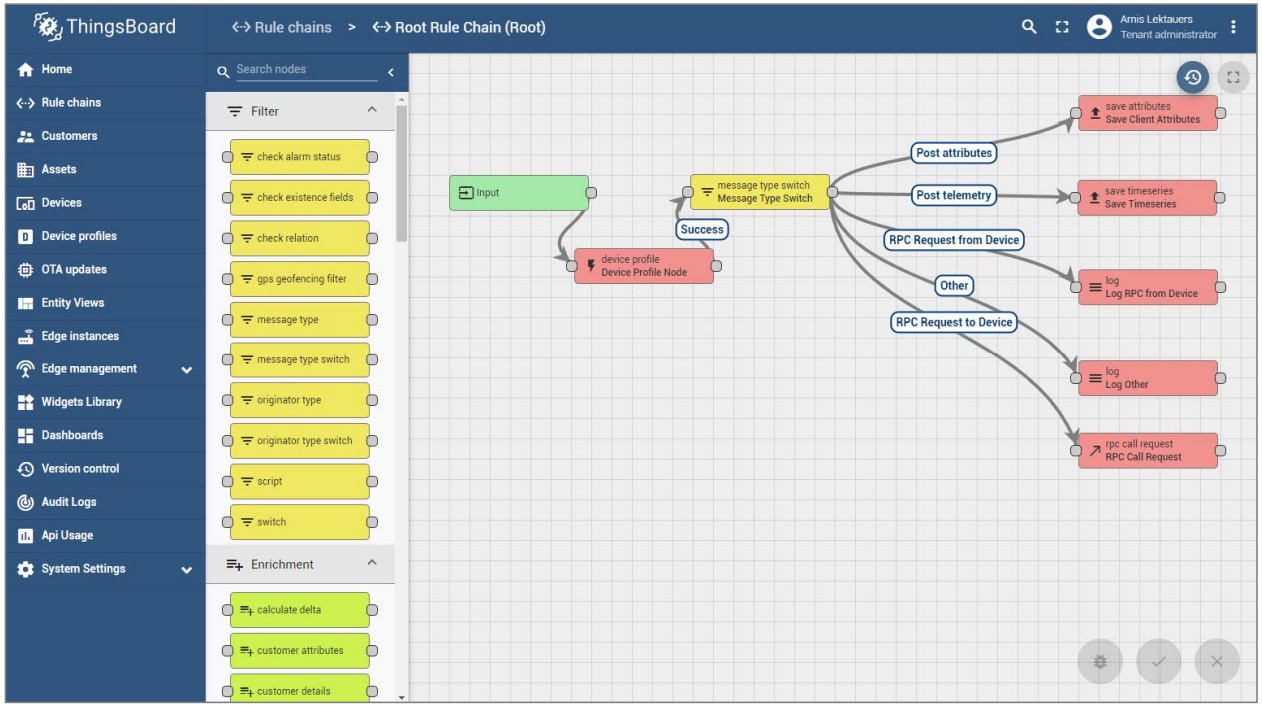
THINGSBOARD IOT GATEWAY



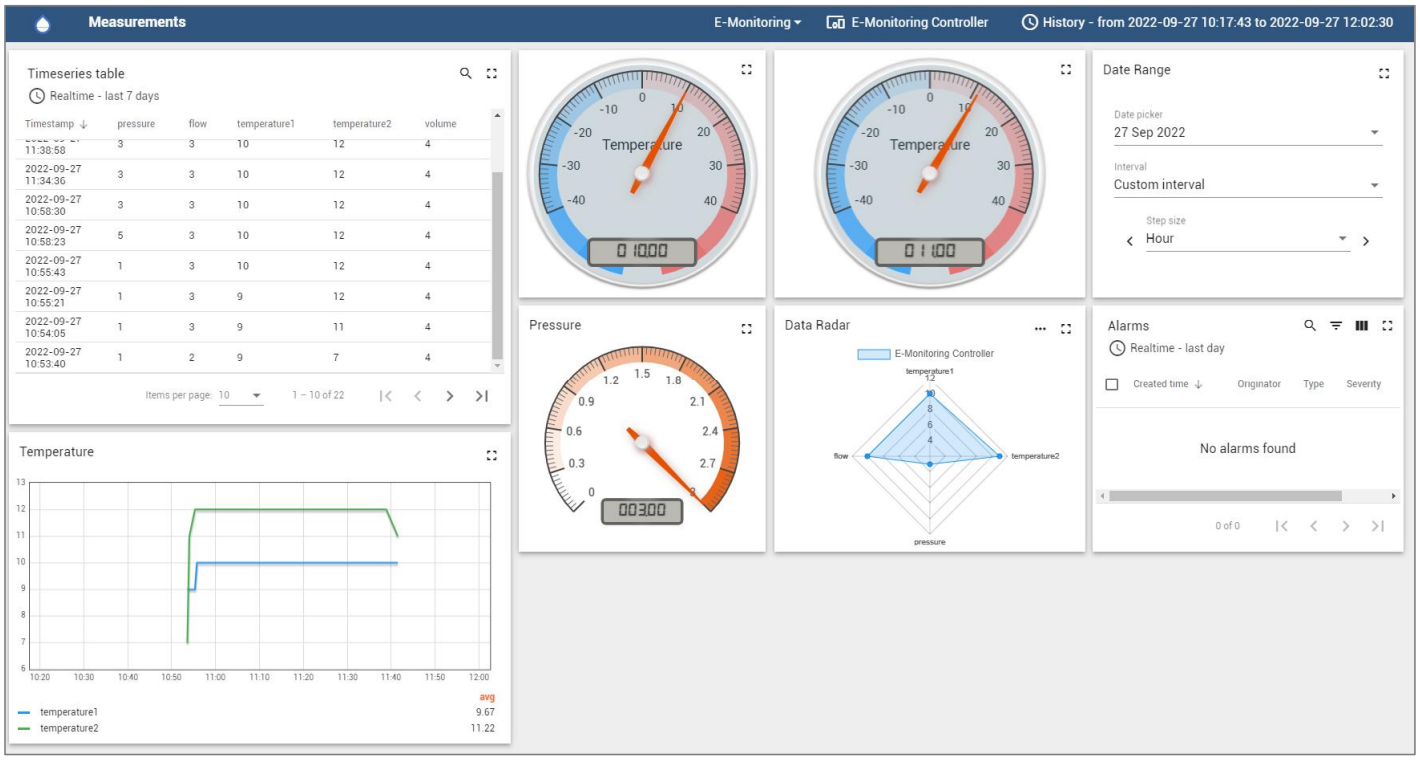
MONITORING SYSTEM MANAGEMENT



RULE MANAGEMENT



E-MONITORING DASHBOARD



THANK TO YOU FOR ATTENTIOM