Project »StadtLärm« – A Distributed Sensor Network for Monitoring Noise Level and Noise Sources in Urban Environments

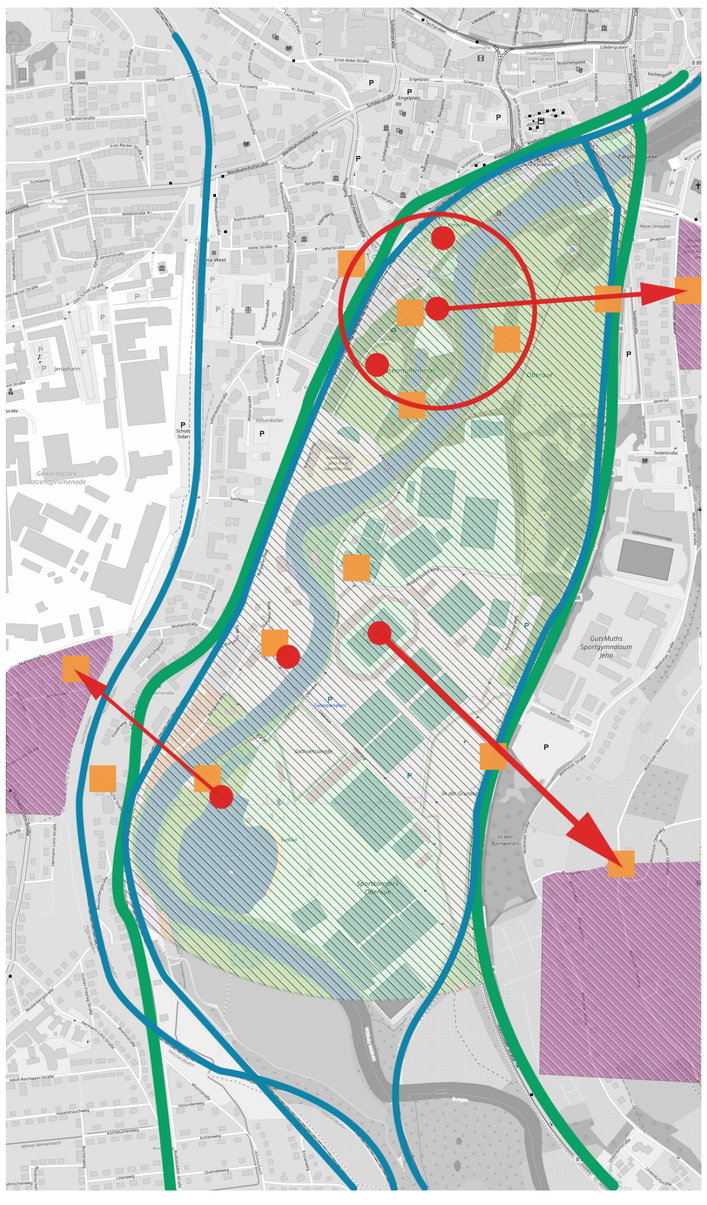
Jakob Abeßer, Robert Gräfe, Christian Kühn, Tobias Clauß, Hanna Lukashevich
Fraunhofer Institute for Digital Media Technology IDMT, Ilmenau, Germany

Motivation

- Increasing noise pollution in urban environments
  - Various acoustic sources (car, construction sites, railway traffic)
  - Public sport and music events
  - Noise complaints in residential areas
- Long-term noise exposure has harmful effect on health
- City administration must regulate & control noise sources
  - Manual noise measurements are ineffective
- Smart city applications with IoT devices allow for a
  - **Systematic, distributed, and continueous acoustic noise monitoring**

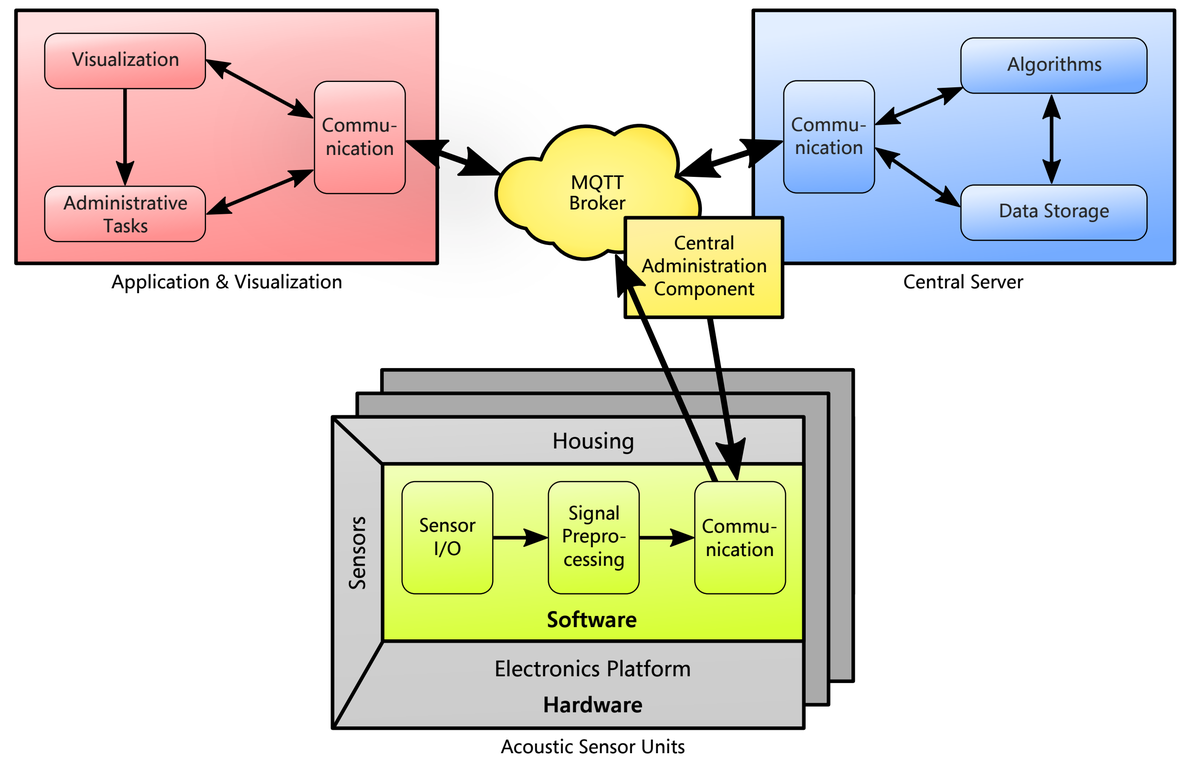
Use Case "StadtLärm" project (city noise)

- City of Jena (Thuringia)
- Population of 108,000
- Park area along the Saale river in central position in the city
- Noise emission
  - Two main streets, tram & train tracks
  - Restaurants, open air venues, sport arena
- Noise immission in 3 residential areas

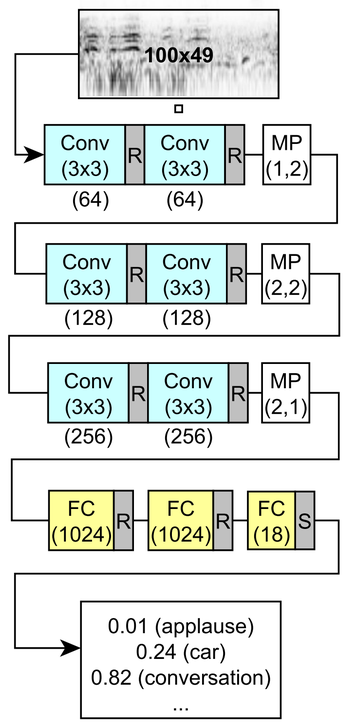


Technical Solution

- System Architecture & MQTT Broker

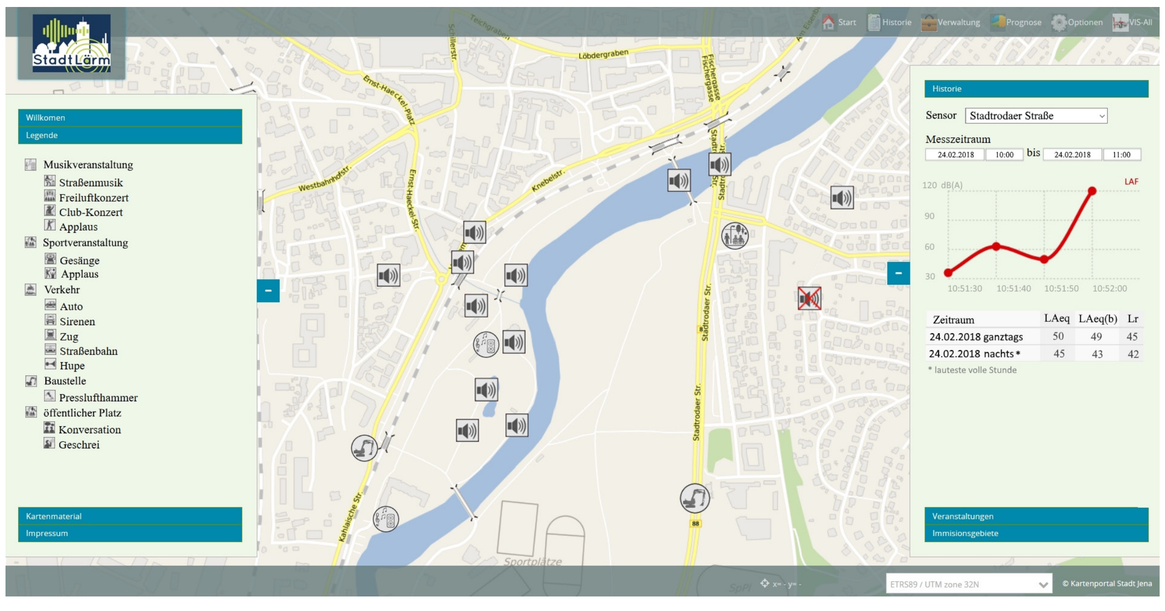


- Acoustic Sensor Units & Central Server



Acoustic Scene	Acoustic Event
Music Event	Applause, Busking, Club Concert, Open Air Concert
Public Place	Conversation, Shouting
Roadworks	Jackhammer
Sports Event	Applause, Chants
Traffic	Car, Horn, Siren, Train, Tram

- Application & Visualization



IMMS
SOFTWARE SERVICE JOHN
Bundesministerium für Wirtschaft und Energie
Fraunhofer IDMT