How we build Smart City projects

Open Smart City concept and our Smart Lighting project

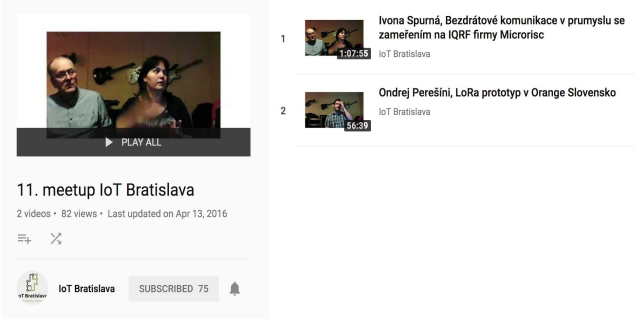
History

- 10/2014 community IoT Bratislava
- 04/2017 MAKERS s. r. o. established

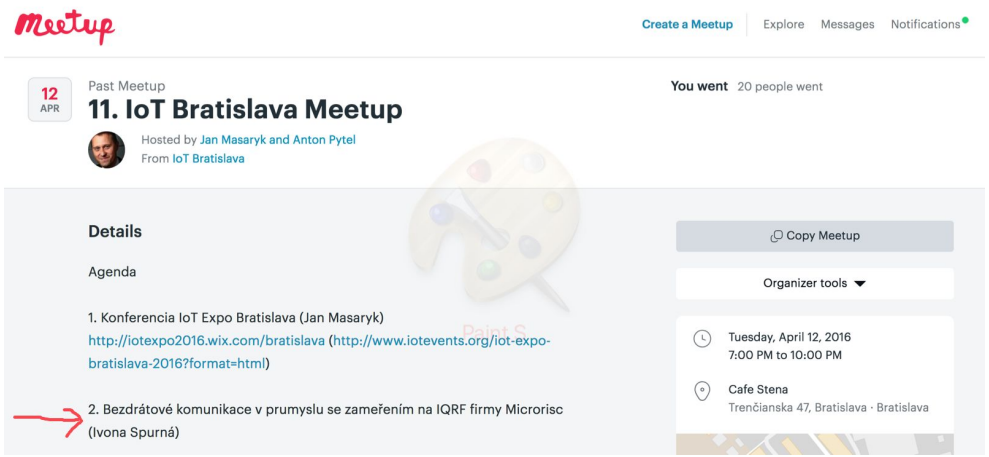
Who we are

- Slovak private-owned company
- 4 founders, currently 12 people
- IoT project in Slovakia and Austria

MAKERS (IoT Bratislava) & IQRF?



- first contact on 11. IoT Bratislava Meetup (12.04.2016)
  - Meetup page
  - Youtube
- MAKERS preparing IQRF support on several layers
  - Edge Remote Controller (IQRF modul)
  - IoT platform integration
- We are looking for partners in the areas
  - sales & marketing channels
  - HW sensors & actuators
  - Edge GW & connectivity (yes IQRF :-)
  - Machine Learning & AI



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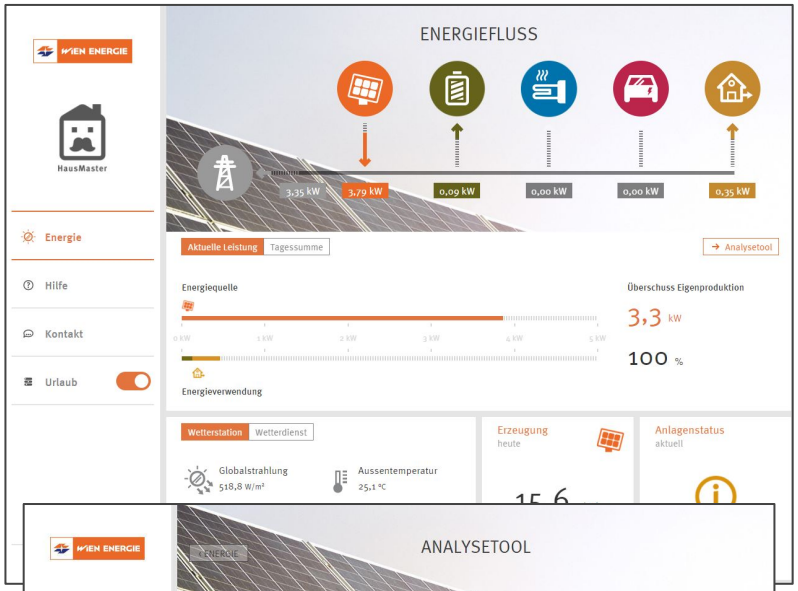
our services

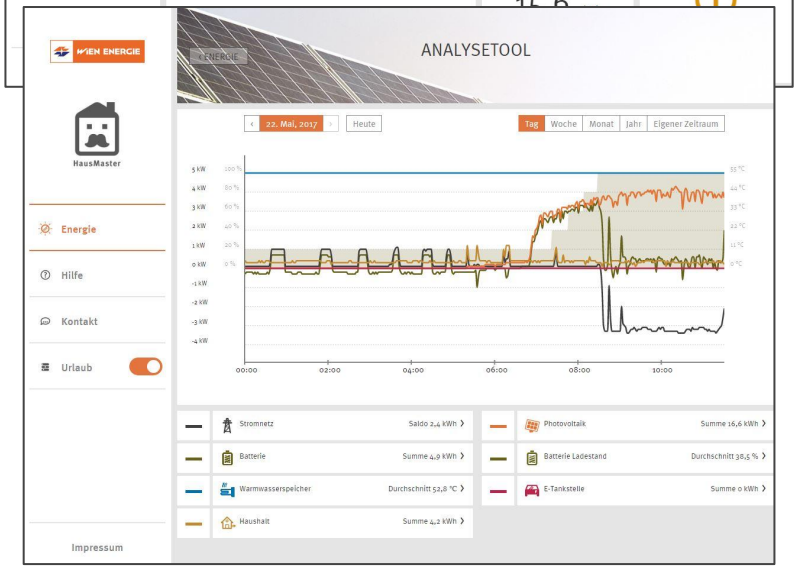
design and implementation complex projects in the area of ***Internet of things*** *for business customers*

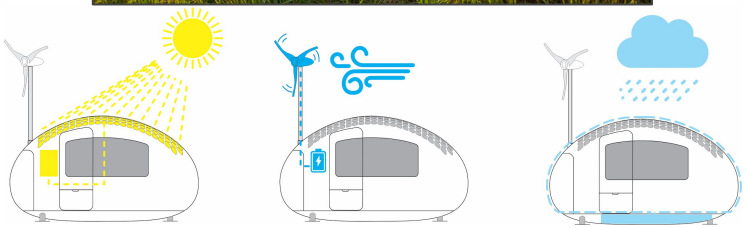
1. design concept, architecture and technology of future IoT solution
2. hardware selection and integration
3. programming of IoT Edge and PLC remote controllers
4. IoT platforms integration & development
5. API development
6. BigData development and data integration
7. GUI configuration and development for web and mobile

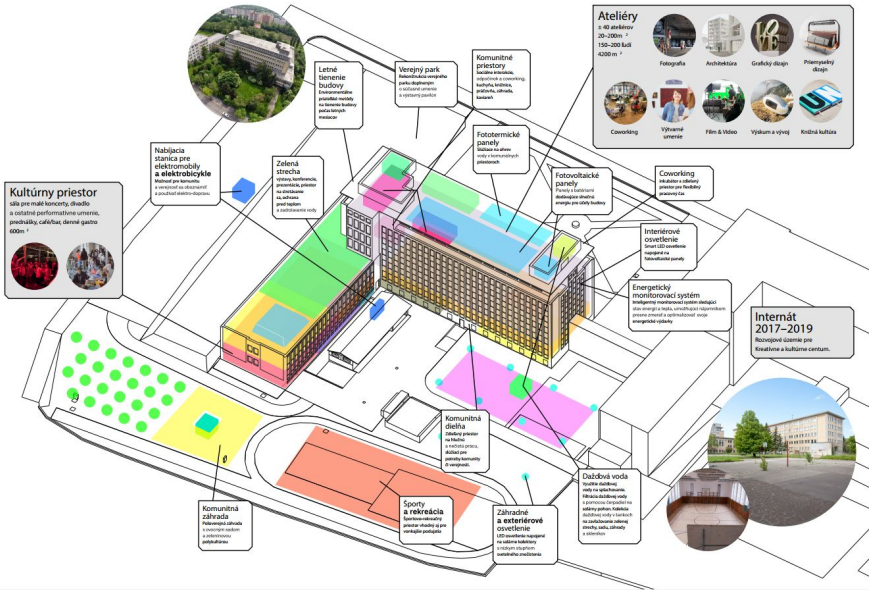
we deliver complex IoT systems for B2B customers
in line with the concept of an **open ecosystem**

Our References









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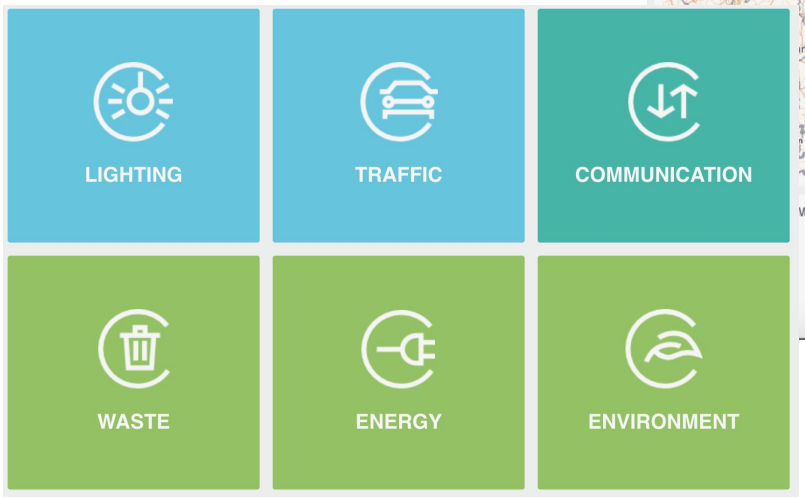
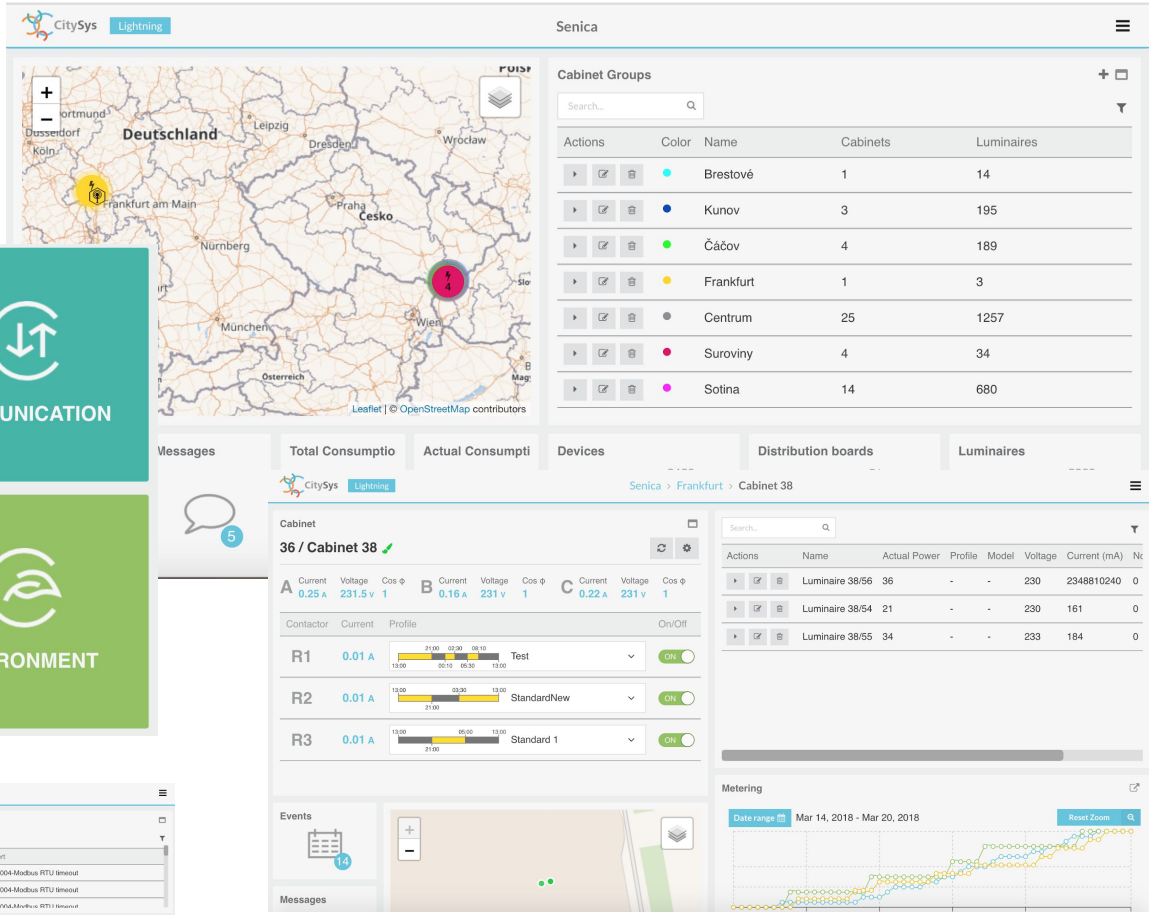
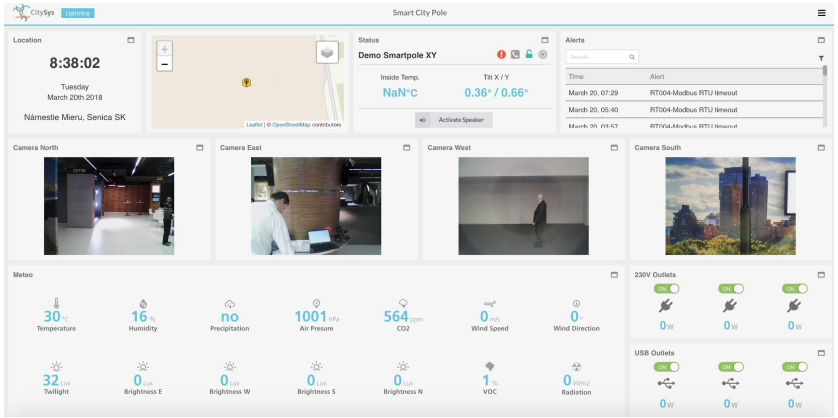






Open Smart City Concept & Smart Lighting project

Challenges for the City

- a large number of events and the **complexity** of city management
- already **various systems** installed or in prototyping
- **unknown** future requirements and fast innovations
- **limited funding** sources

new point of views & requirements

- services *not only for inhabitants*, also for private companies and any relevant parties

Open Smart City Concept should be ready to ...

1. **optimize finance and resource** in Smart City development by using various components and systems
2. **implement inter-connected functionality** over any Smart City components (even for unknown requirements) by using scenarios and integrated components and systems
3. **generate income** for Smart City concept participants by using new products and services

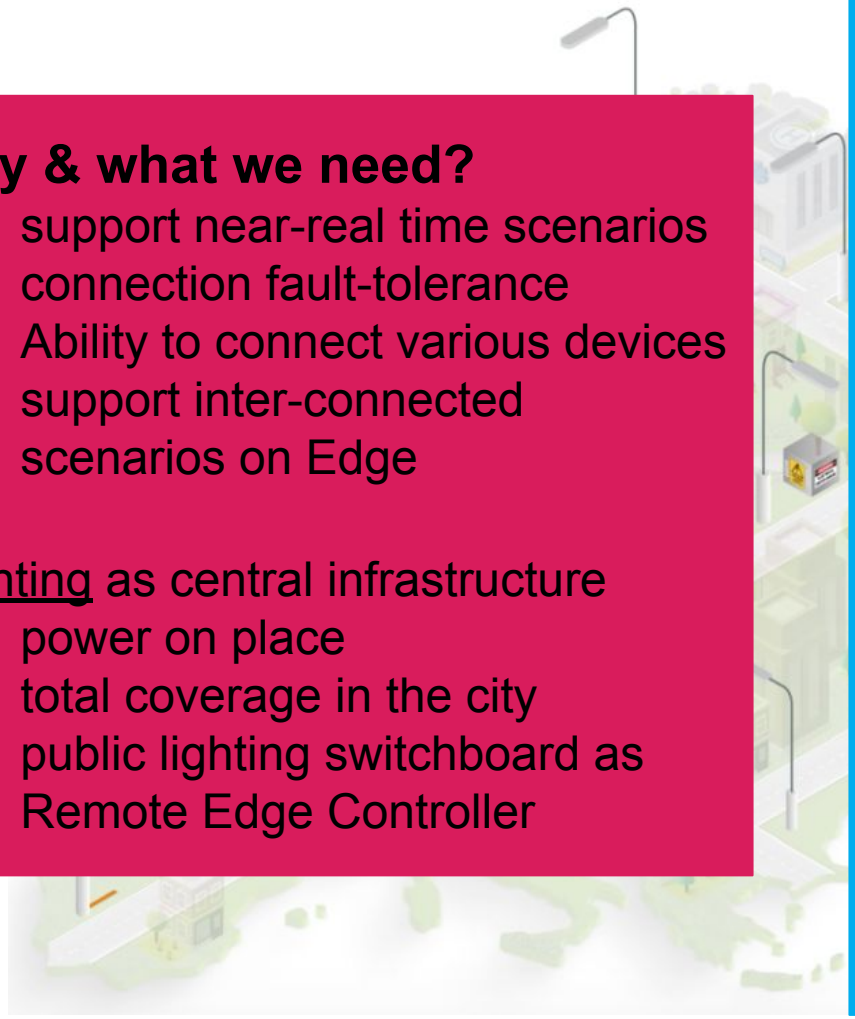
Open Smart City Concept must have ...

1. **open architecture** with ability to integrate/change components and systems on any architecture layer.
2. **open ecosystem** of suppliers delivering solutions with standardized and open API for remote commands & data exchange.

IoT Reference Architecture

- **GUI apps** - mobile & web applications
- **Business Systems** - cover business functionality for use case where IoT solution is deployed such as payments
- **IoT platforms** - manage and control assets & devices, identity & access management, user management, data process & storage (including BigData support), API for 3rd systems & GUI apps
- **Gateway and Connectivity Layer** - collect and transfer data & commands (mesh, LPWAN, NB-IoT, Bluetooth, …)
- **Edge Layer** - devices, actuators and remote controller

Edge & Devices Layer



why & what we need?

- support near-real time scenarios
- connection fault-tolerance
- Ability to connect various devices
- support inter-connected scenarios on Edge

Lighting as central infrastructure

- power on place
- total coverage in the city
- public lighting switchboard as Remote Edge Controller

what we do?

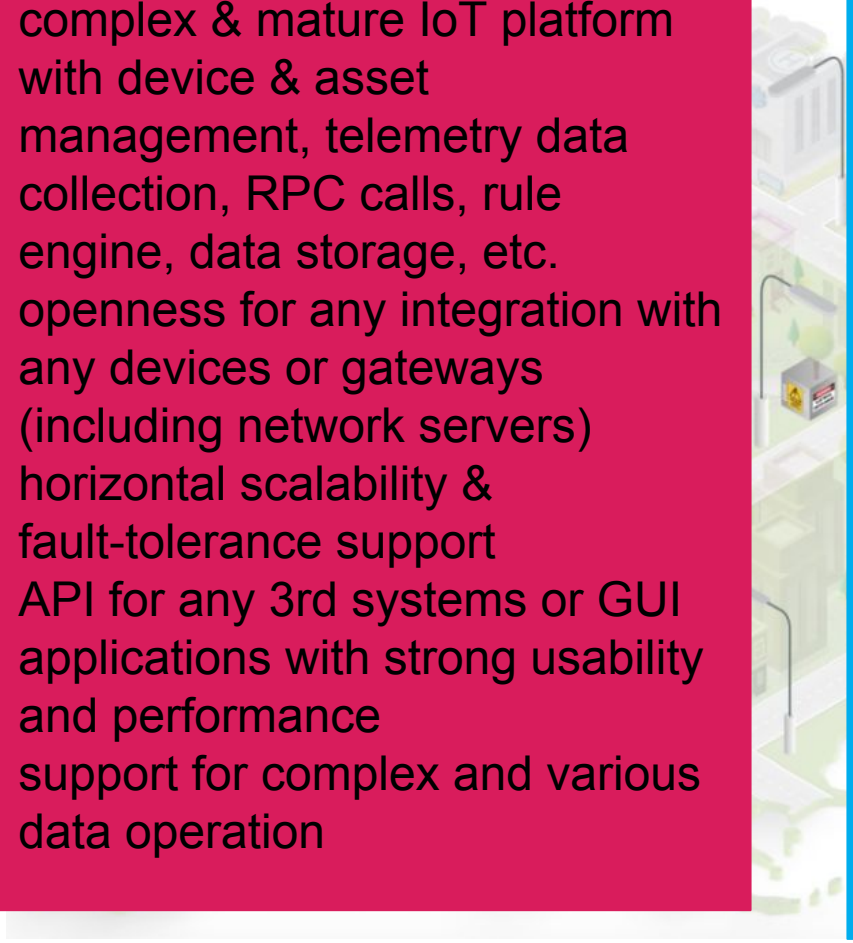
we develop controller for public lighting switchboard and SmartPole:

- based on standard operating system (Linux) and LogicMachine product,
- support many interfaces (e.g. KNX, Z-Wave, ModBus RTU/TCP, BACnet IP, EnOcean, DMX, M-Bus, GSM, 1-wire, DALI, Bluetooth 4.0. LE),
- standardized interfaces for command calls and communications as REST API, MQTT support,
- open for programming in any LUA scripts,
- has several type of databases to prevent data loss,
- compiled interpreter for best performance,
- abstract data model for effectivity efficiency,
- tools for automated deployment, diagnostics and configuration,
- etc.

Platform & API Layer

why & what we need?

- complex & mature IoT platform with device & asset management, telemetry data collection, RPC calls, rule engine, data storage, etc.
- openness for any integration with any devices or gateways (including network servers)
- horizontal scalability & fault-tolerance support
- API for any 3rd systems or GUI applications with strong usability and performance
- support for complex and various data operation



what we do?

- we customize and extend open source IoT platform which has
  - support of custom attributes
  - standardized two-way communication
  - asset management, modelling & relations
  - custom object as part of platform
  - expandable and scalable rule engine
  - etc.
- we integrate & customize BigData platform
- we develop API on the top of IoT and BigData platforms using GraphQL and REST API (used by 3rd systems and GUI apps)

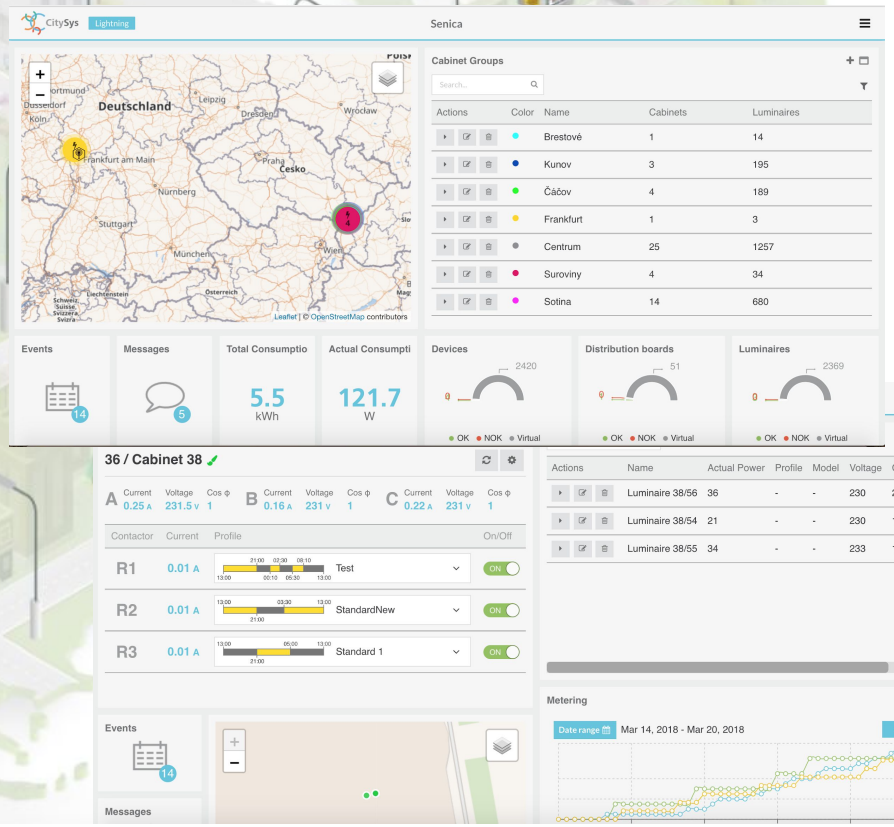
GUI Layer

what we do?

- we develop thin GUI with re-usable widgets (already used in Smart Retail and Smart Industry concepts)

why & what we need?

- complex GUI
- lighting specific screens and functionality
- modularity for future development (not only Smart City)

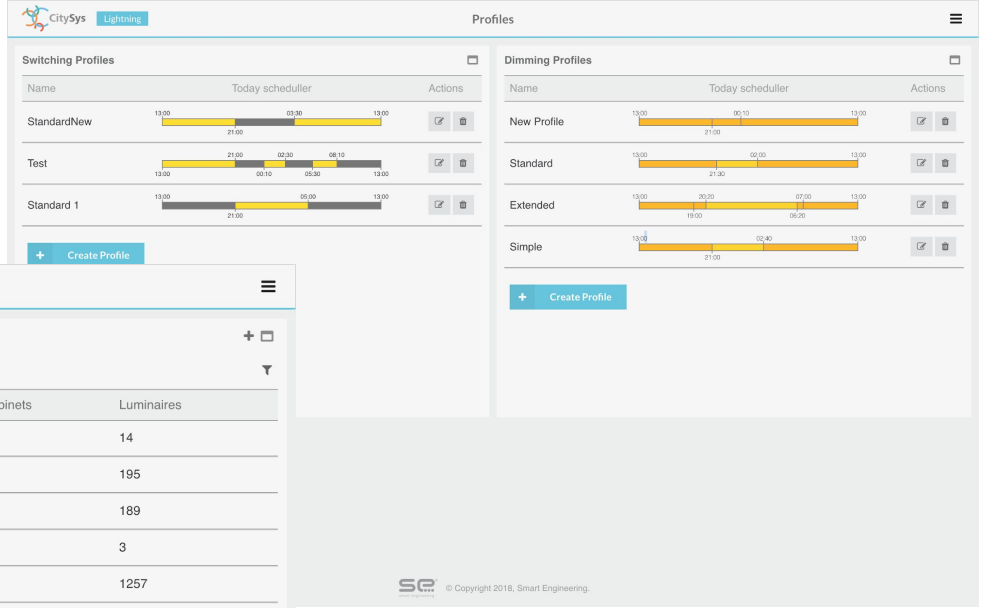


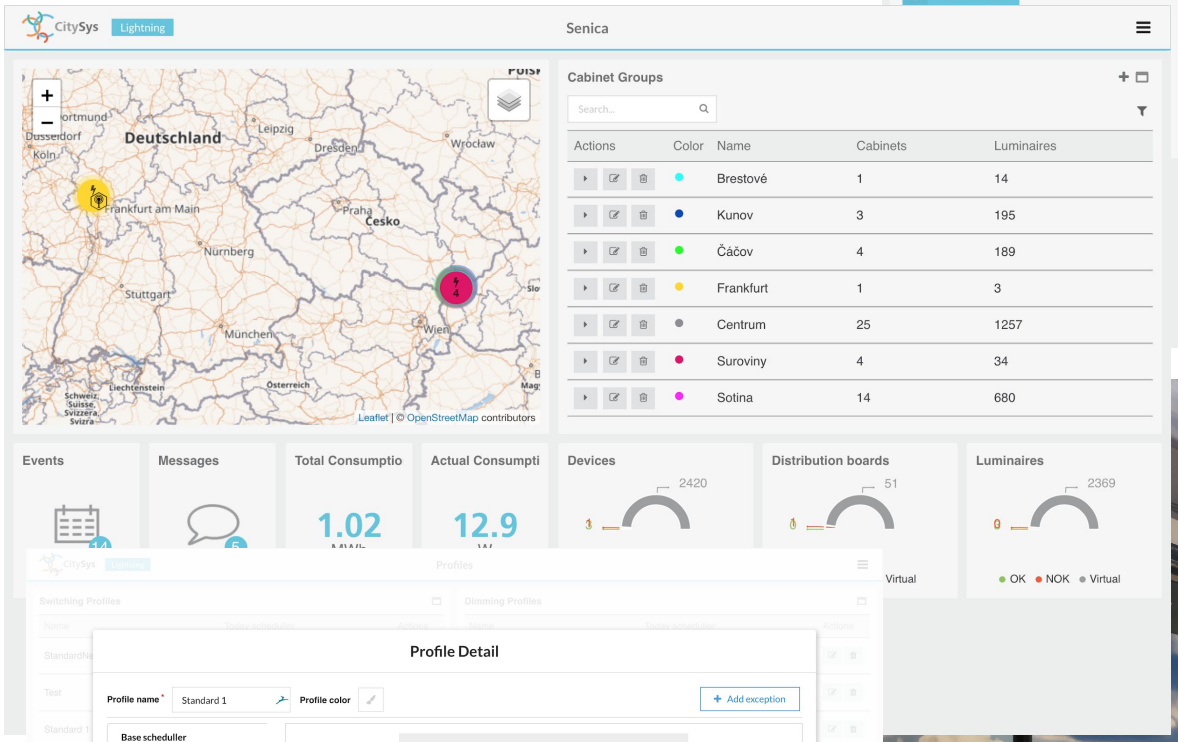
What we achieve ...

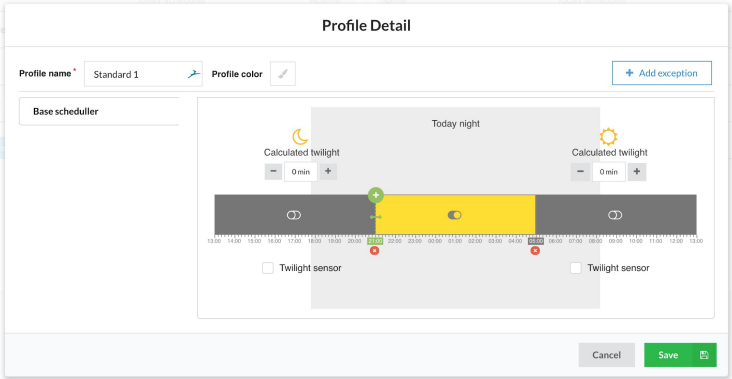
- Smart Lighting solution in 6 months, include:
  - Smart Public Lighting Switchboard, Smart Pole, City Pole (same Remote Controlled, various models)
  - IoT & Big Data platform (including optimized API)
  - specialized Smart Lighting GUI

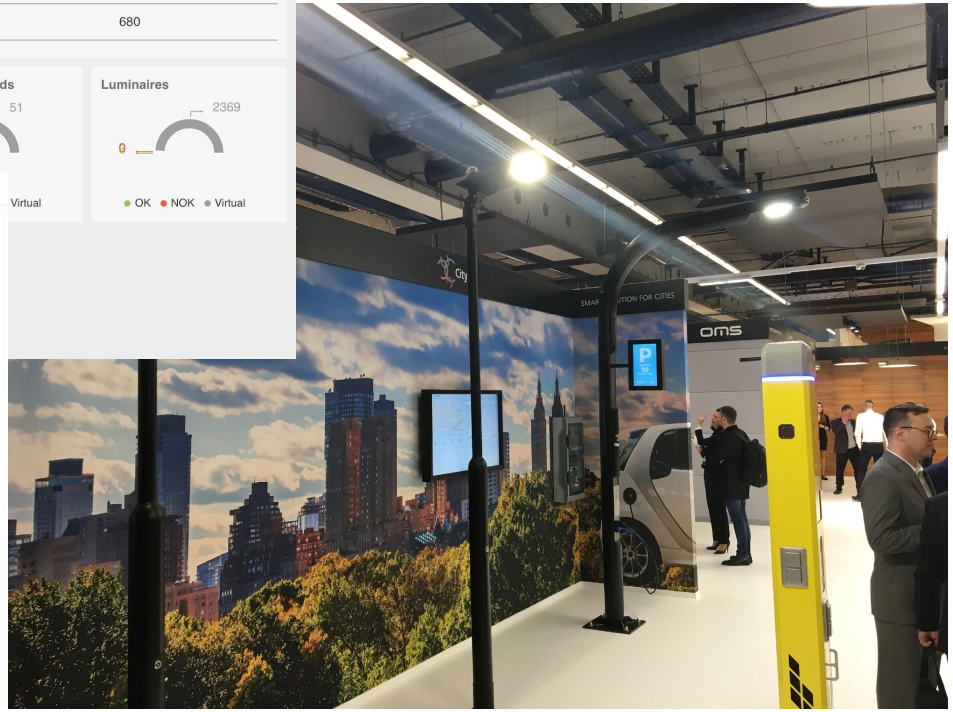
- **open and expandable Smart City solution** which can be extended by any solution and on any levels (we are already working on such a extensions)
- **ONE Smart Lighting solution** for many areas such Smart City, Smart Retail, Smart Industry

Examples - Lighting

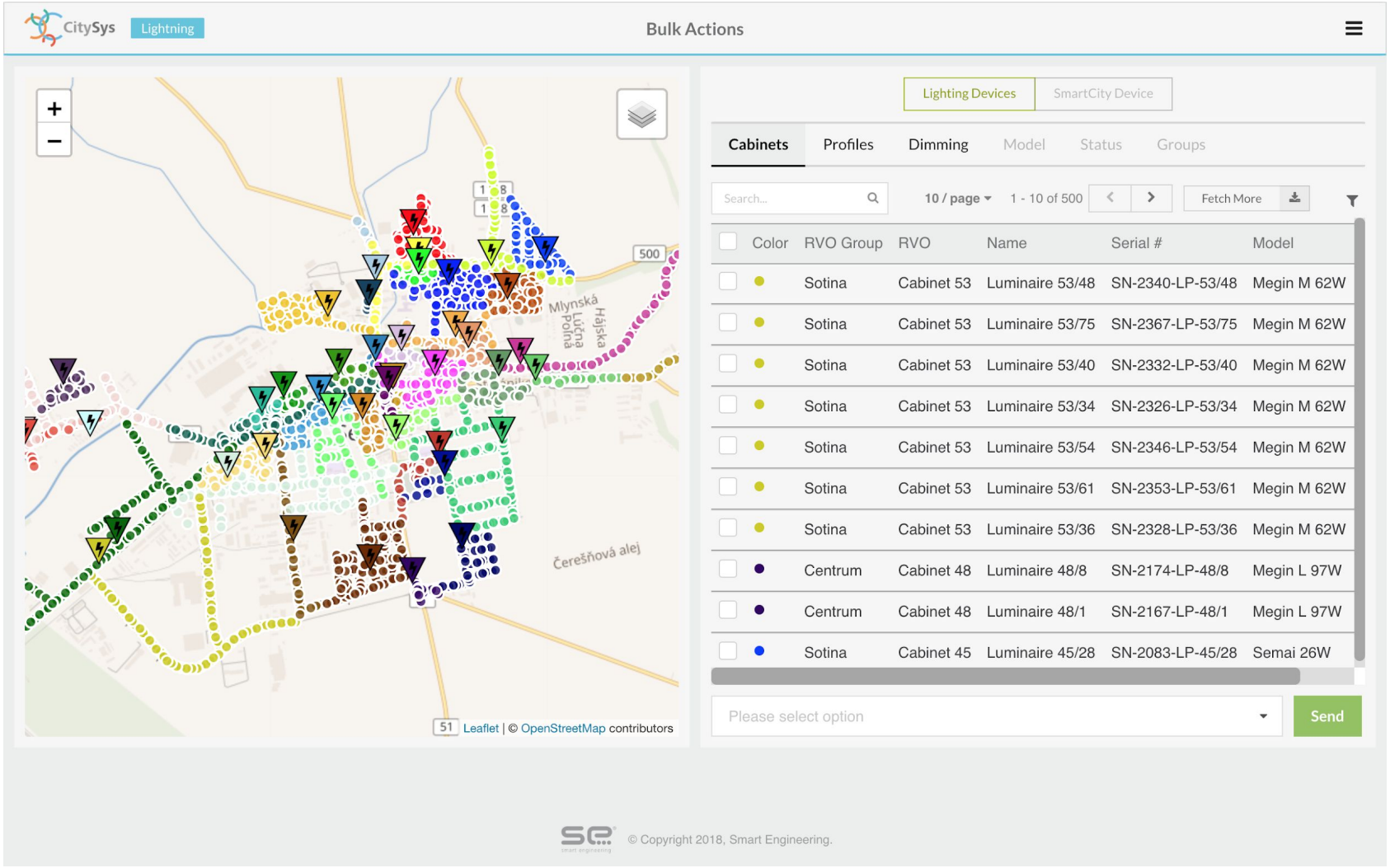




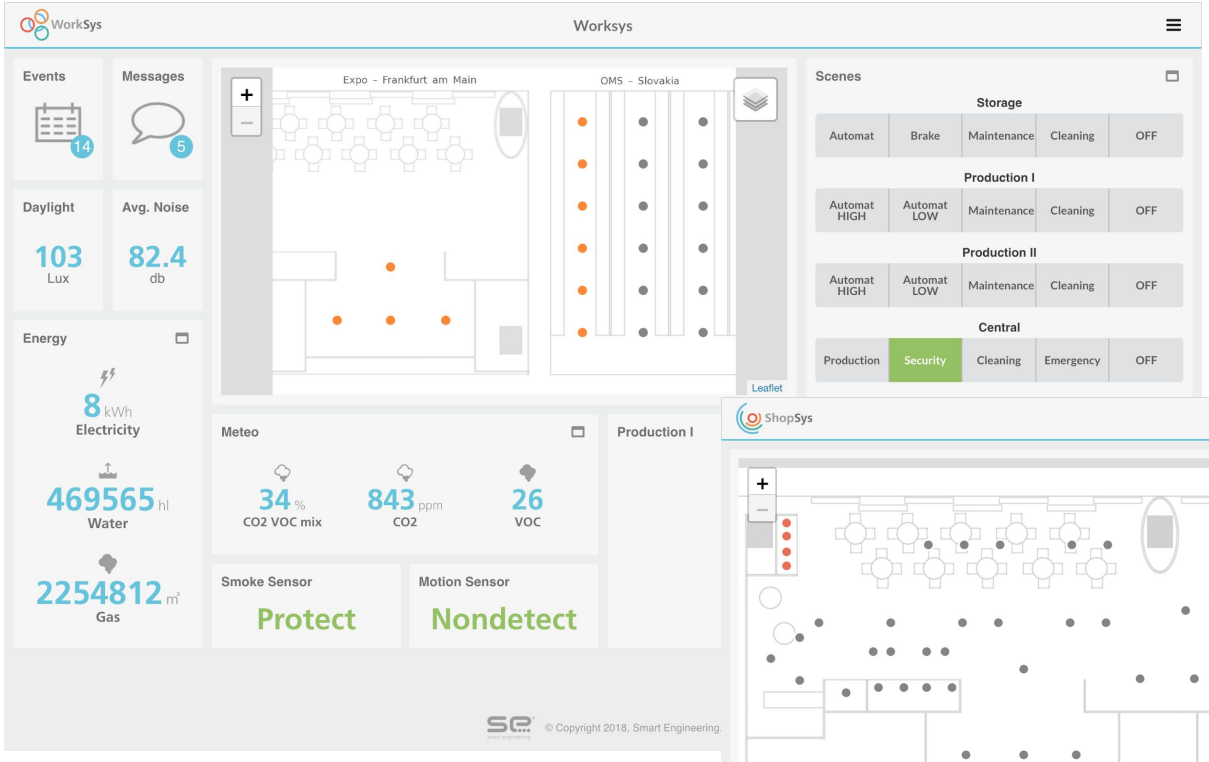


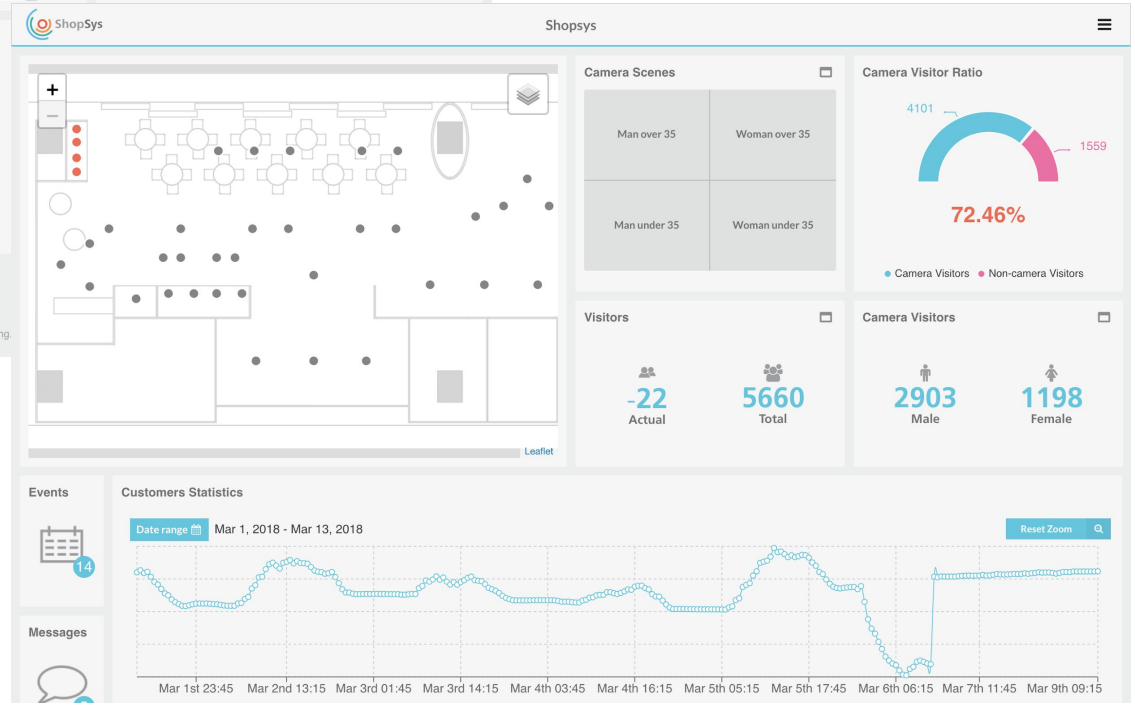


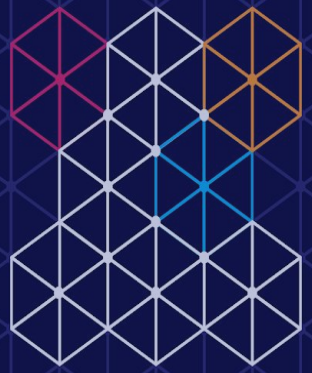
Examples - Lighting



Examples - Others







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