Naming, Twinning and Observing - Towards Scalable, Reliable and Resilient CPS

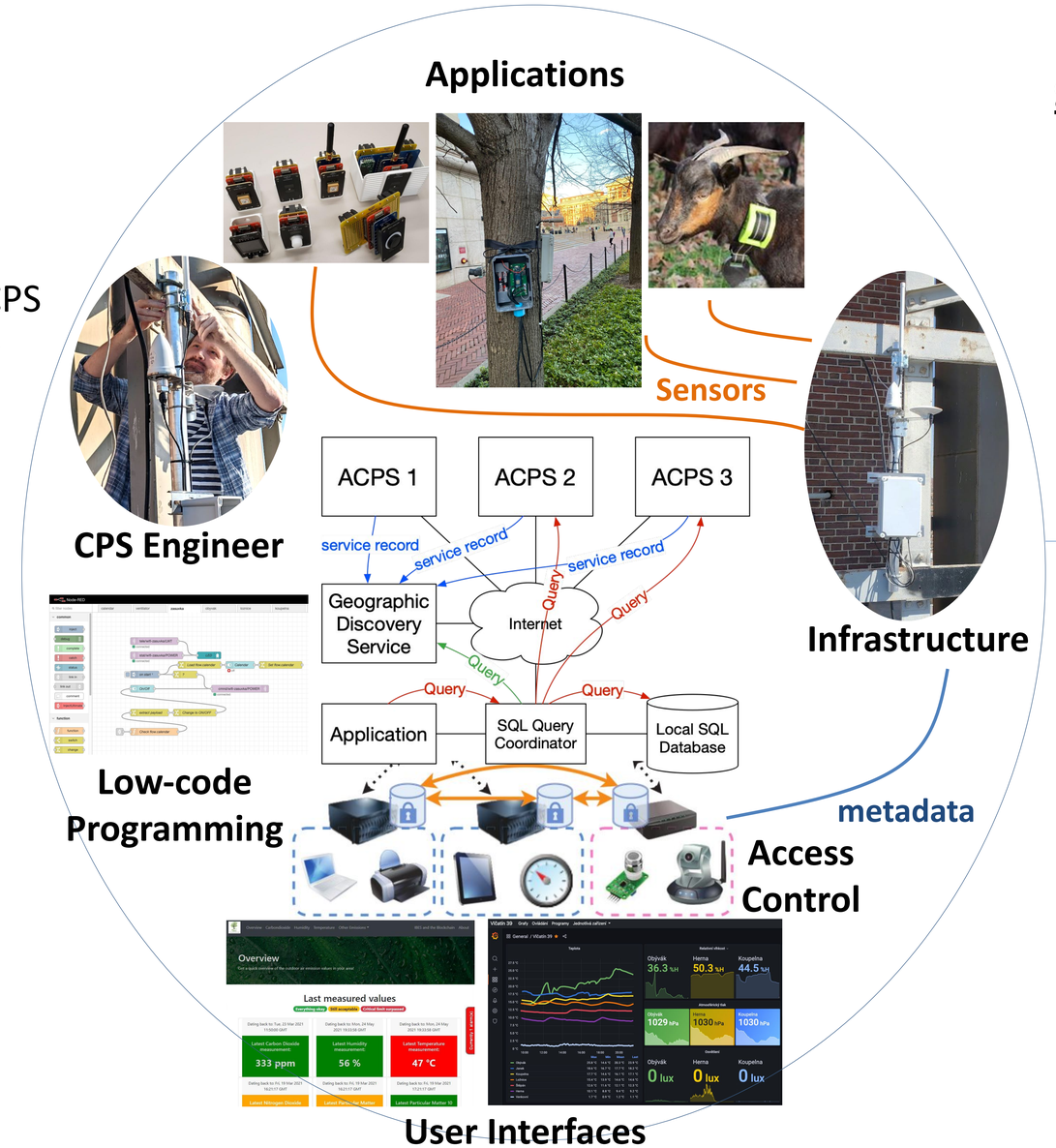
Challenges

- Share network infrastructure and services by multiple CPS applications
- Geographically dispersed heterogeneous CPS
- Growing management complexity in CPS
- Missing programming abstractions for networked CPS
- Data discovery and storage, access control, query processing

Solution

Network services for large, federated, heterogeneous CPS:

- Shared network architecture
- Attribute-based access control
- Discovery for geographical sensor data
- Low-code programming abstractions
- Metadata storage and discovery



Scientific Impact:

- Prototype systems for building, programming, managing, and controlling CPS.
- Explore a variety of sensor-based applications enabled by LoRa technology.
- Scale data storage, protocol, and processing for geographically distributed CPS services.
- Propose distributed attribute-based access control solution using CPS metadata and capabilities

Broader Impact:

- Public LoRaWAN infrastructure on Columbia University campus
- Environmental monitoring, erosion detection, soil monitoring, dendrometers, etc.
- Integrate CPS topics in University courses

Education & Outreach: The project supports 2 PhD students and 2 REU students (summer 2022).

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