

The Urban Internet of Things

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Cities are living organisms shaped by people



Objectives of Smart Cities

- Sustainable urban development and increase in quality of life
- Usage of IT to transform **passive objects** with delayed problem management to those with **automatic sense-and-respond capabilities** getting ad-hoc upgrades



Environment

buildings, public spaces, pollution



Infrastructure

water, waste, electricity, gas, internet



Transportation

pedestrian, bikes, cars, public transport



Economy

company – community – person

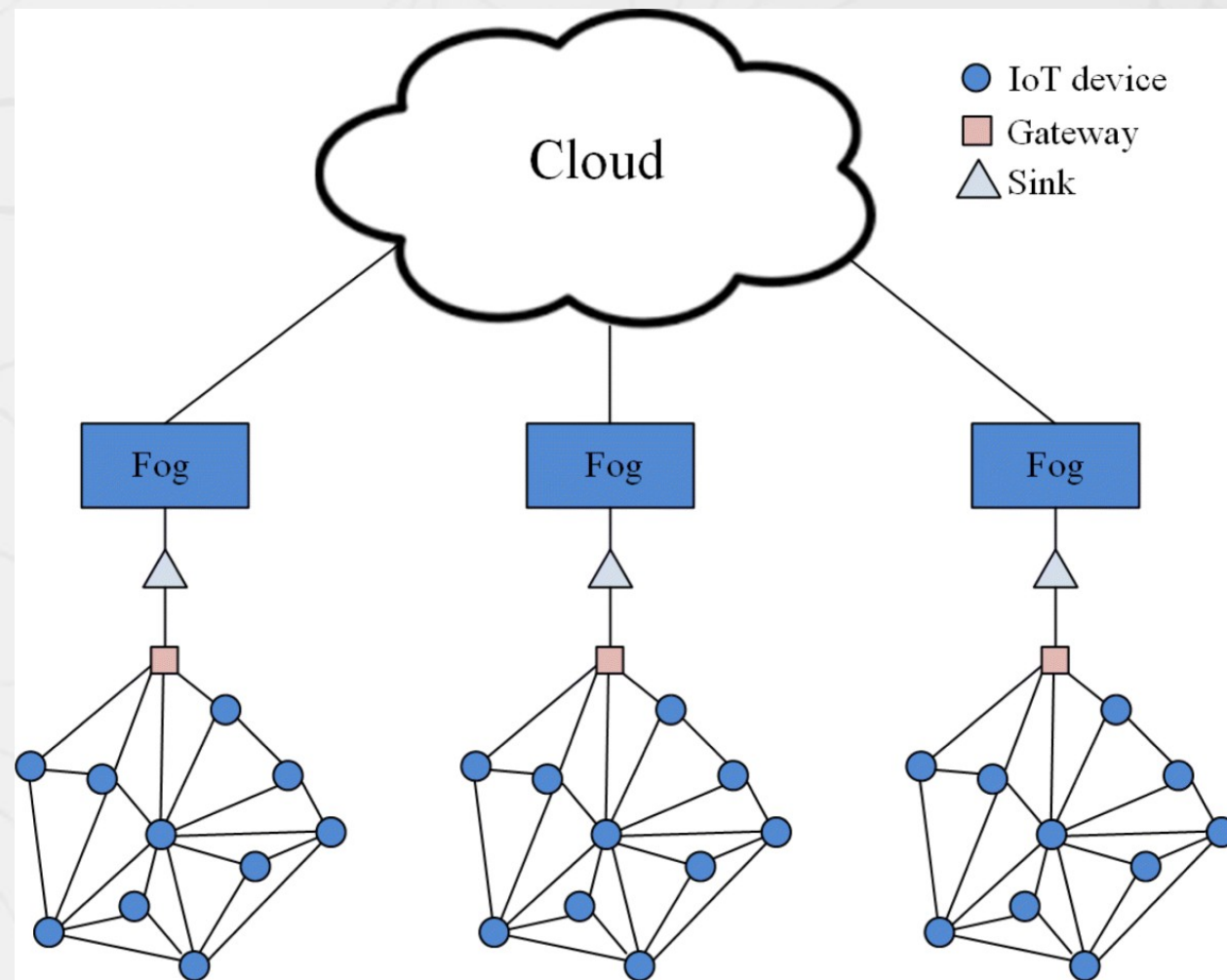


Services

education, welfare, culture, safety



Wireless urban sensor network of IoT devices



Datacentres on the Internet

- analyze and store data
- web interface for citizens

Aggregate one domain

- respond to specific issues

IoT Mesh of sensors

- gather environmental state
- constrained networks

Communication with sensor nodes

Interactions based on: Time, Event, Query

Application layer

MQTT (w/TCP)

- Sensors: **Publish**
- Displays: **Subscribe**
- Central Broker

CoAP (w/UDP)

- Sensors: **POST**
- Displays: **GET**
- REST style HTTP

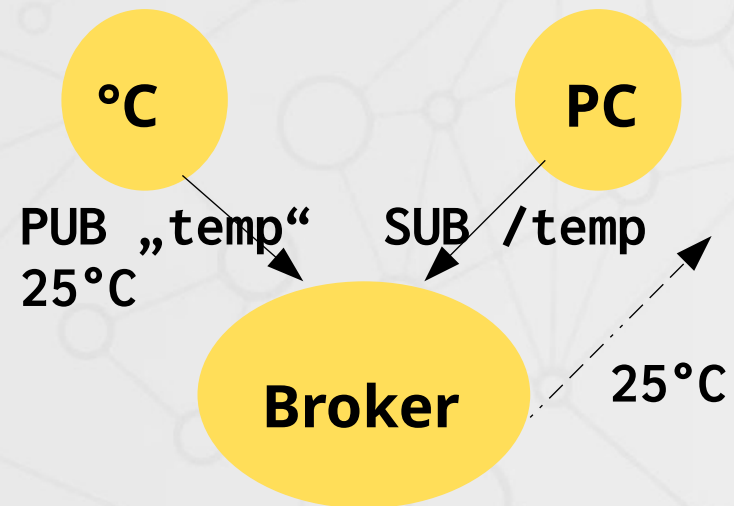
Network layer

- IPv4/6 - 2001:db8:85a3:8d3:1319:8a2e:370:7348

Physical layer

- Wireless (Zigbee, WiMax, Bluetooth, Wifi, GSM, 4G)
- Wired (PLC, Fibre optic, DSL)

MQTT



CoAP

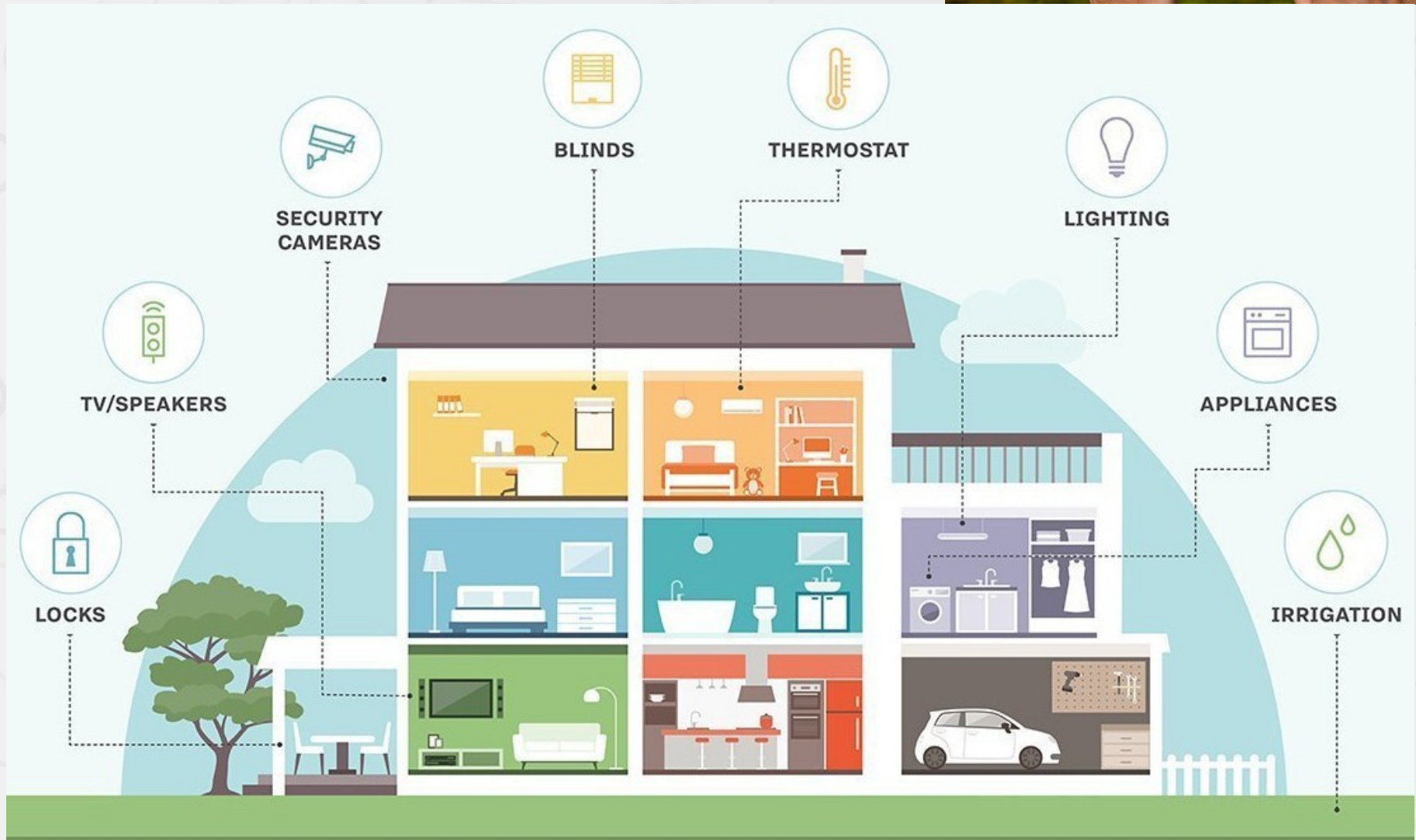


The background of the slide features a complex network graph. It consists of numerous circular nodes of varying sizes, interconnected by thin, light gray lines representing edges. The nodes are distributed across the entire frame, creating a dense, interconnected web of connections. The overall aesthetic is clean and technical, typical of a presentation on network theory or data science.

Applications and examples in the world

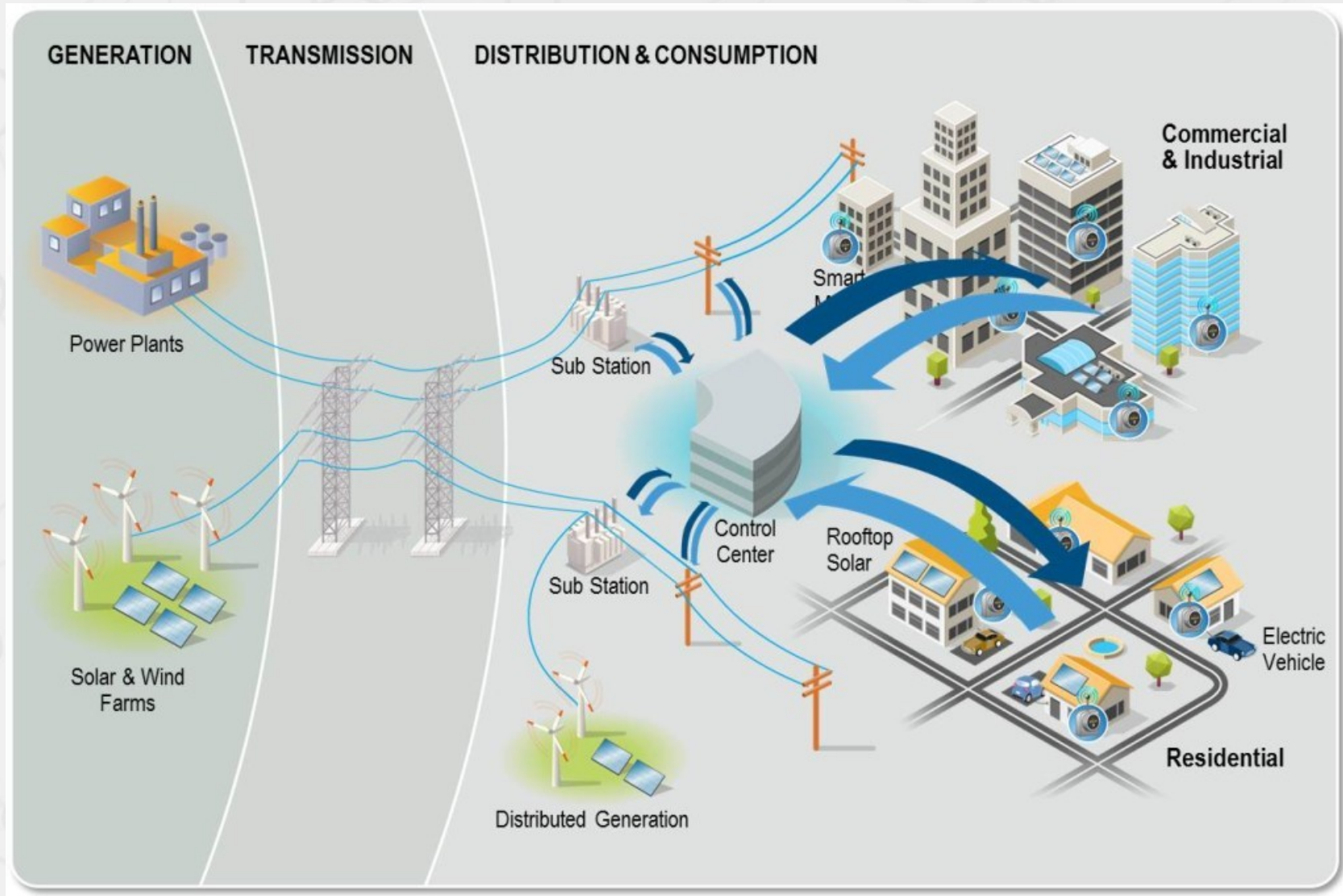
Smart Homes & Residential areas

Automatic, remotely controlled everyday household gadgets and appliances



Energy grid

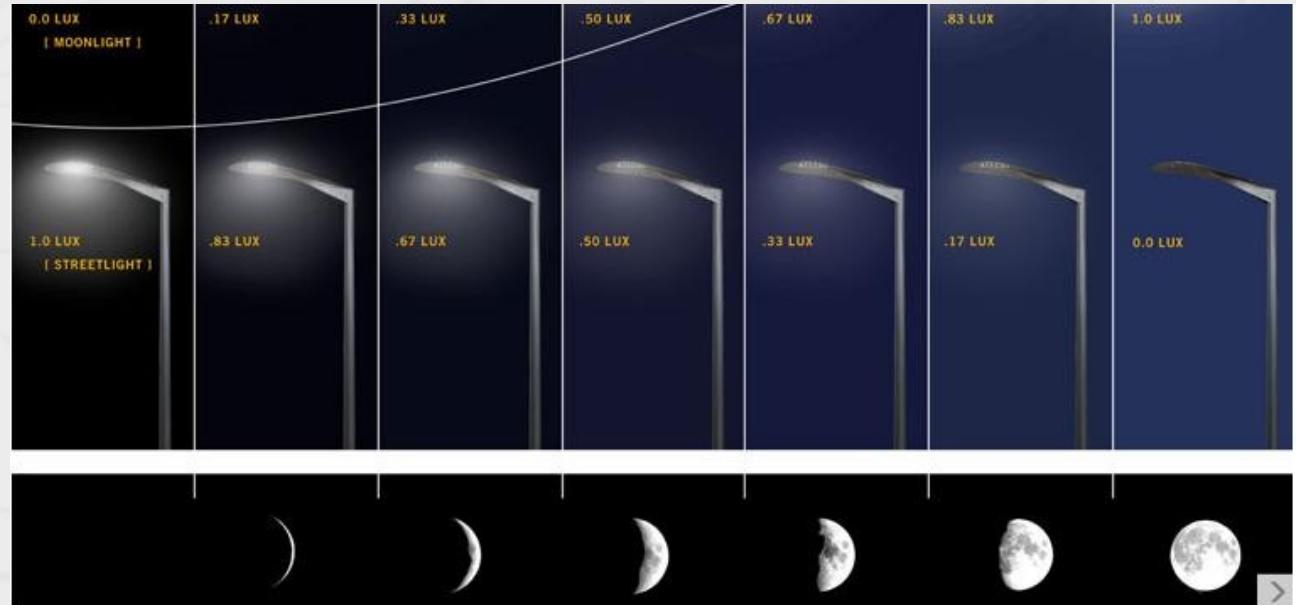
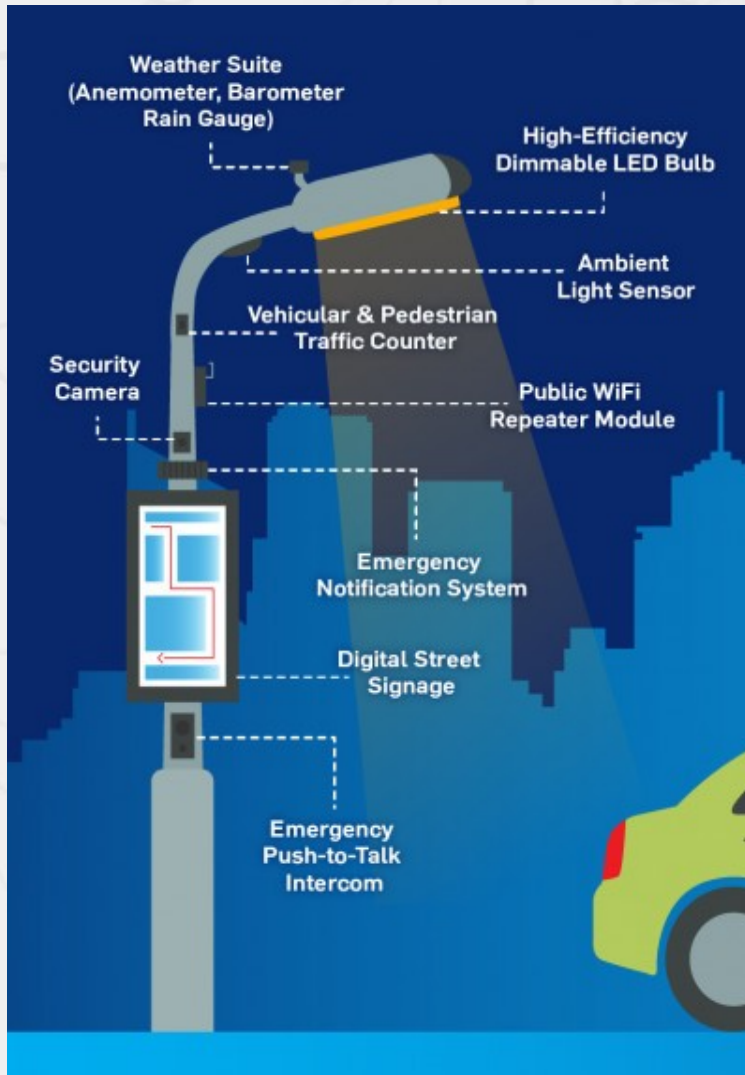
- Demand based electricity allocation with help of smart homes
- Address outages and mitigate them through demand-based pricing



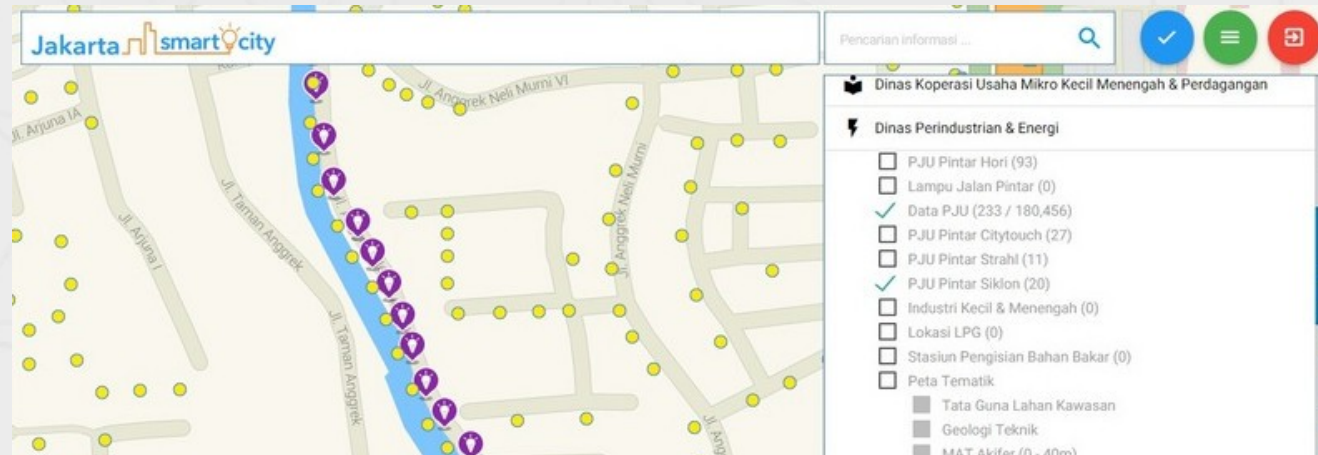
Street lights responsive to lighting conditions

Energy savings in bright moonlight

Lamppost Design

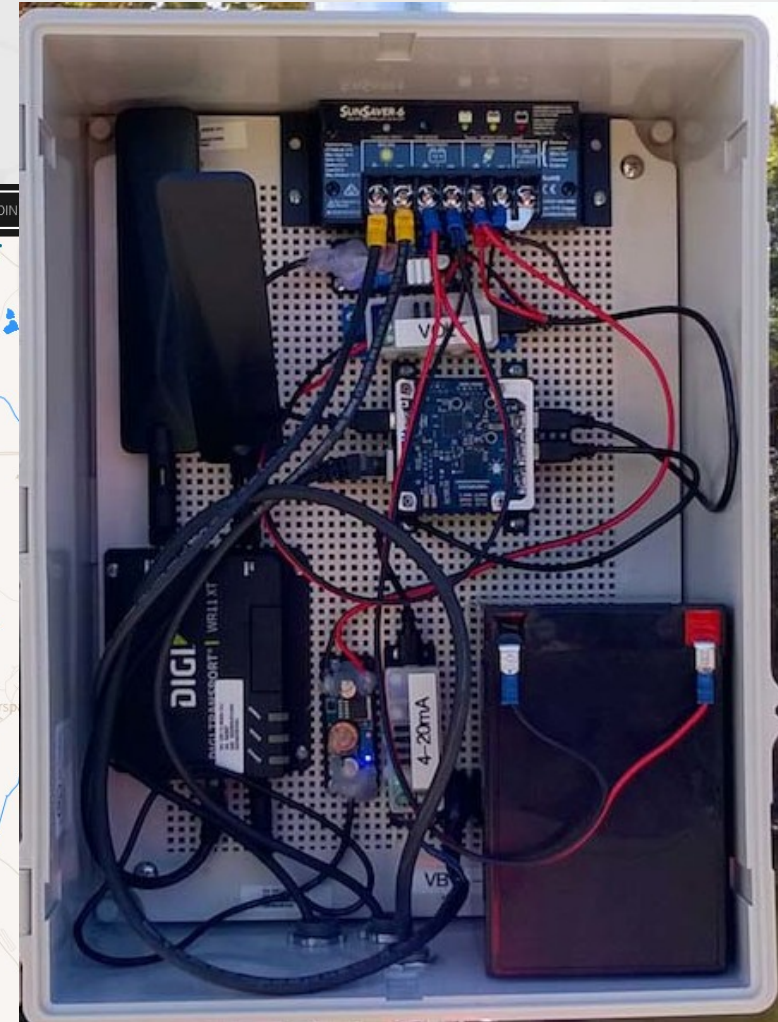
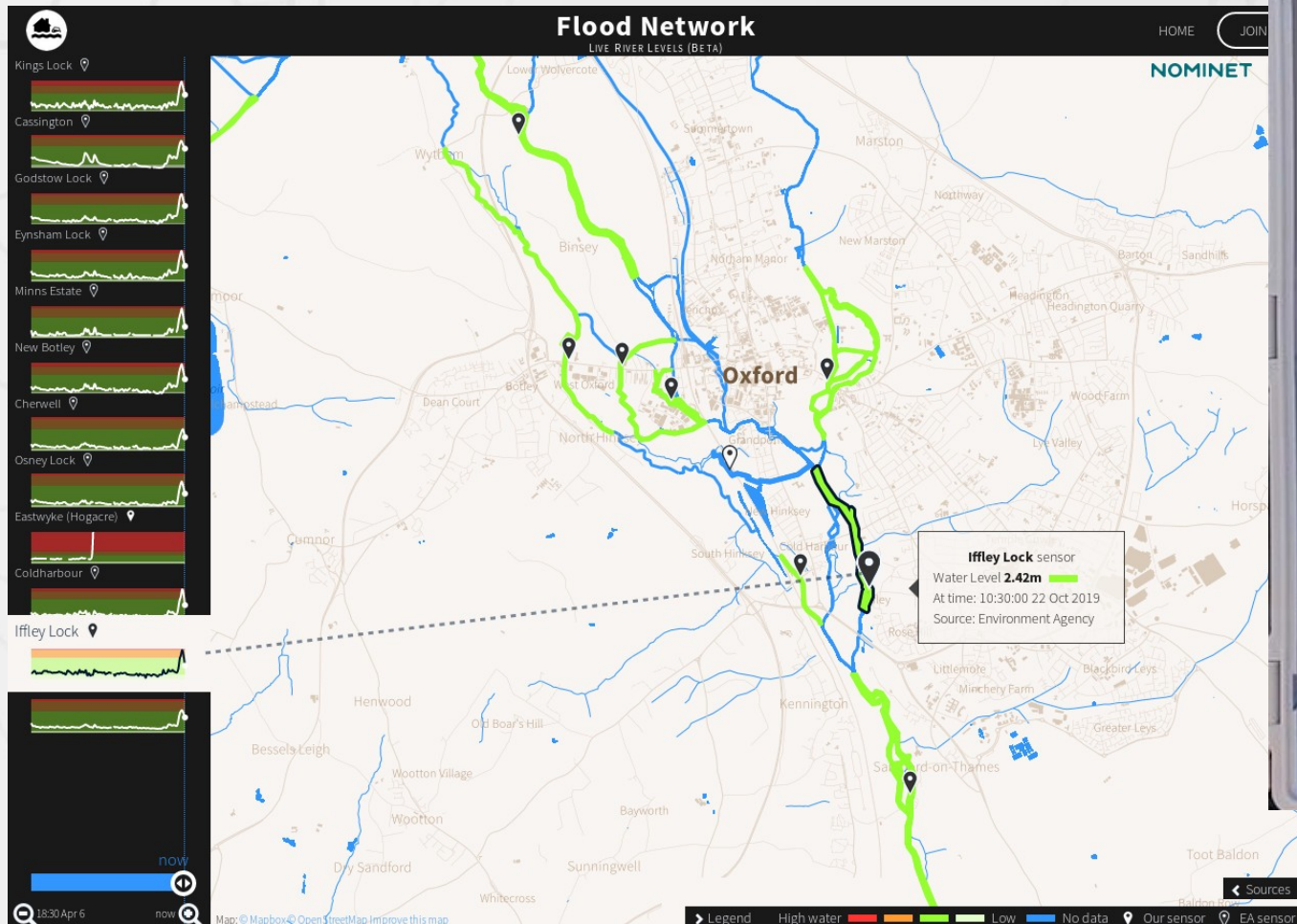


User interface for municipality maintainers



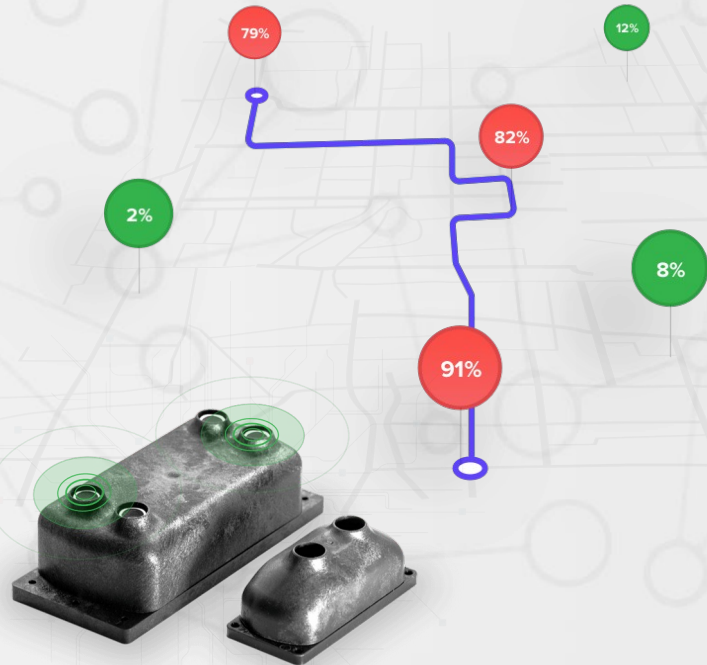
Flood prevention by water level monitoring

- Water level sensor and Rainfall sensors
- Communal real time monitoring of rivers and streams (with national hydrology service)



Waste management

- semi-underground containers with waste level sensors
- plan garbage collection routes
- reduce soil pollution



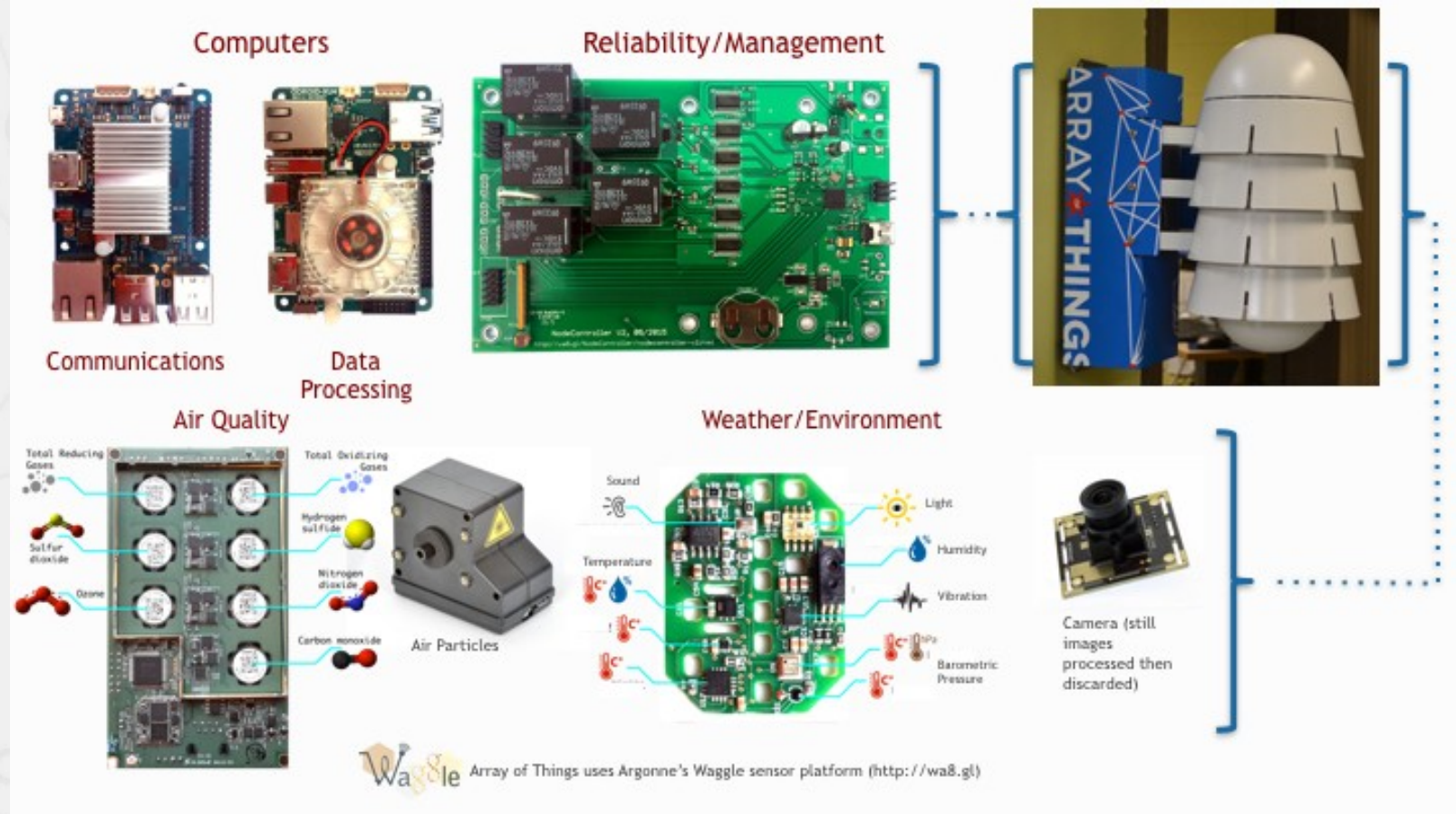
Transportation



Air pollution and weather conditions

Chicago Array of Things:

- weather (temperature, pressure, humidity)
- ambient light level, RMS sound pollution, vibrations
- air pollutants (**CO**, **H₂S**, **NO₂**, **O₃**, **SO₂**)



Data accesibility for public use via Open Datasets, API, GIS

Přihlásit se

PRAHA
PRAGUE
PRAGA
PRAG
opendata
hlavního města Prahy

Datové sady

Organizace

Skupiny

O nás

Vyhledat



🏠 / Datové sady

Organizace

Institut plánování ... 102

Operátor ICT, a.s. 33

Magistrát hl. m. Prahy 29

Technická správa ko... 17

Praha 8 15

Praha 6 14

ROPID 13

Dopravní podnik hl... 8

Praha 5 4

ZOO Praha 4

Zobrazit další Organizace

Skupiny

Tomuto vyhledávání neodpovídají žádné Skupiny

Tagy

Praha 128

doprava 15

granty 14

Vyhledat datové sady...



250 datových sad nalezeno

Seřadit dle: Relevance

Vyhrazené stání speciální

Vyhrazené stání speciální v rámci ZPS (např. policie, diplomaté,...)

GeoJSON zip:dxfl zip:gml zip:shp

Vyhrazené stání pro zásobování

Vyhrazené stání pro zásobování v rámci ZPS

GeoJSON zip:dxfl zip:gml zip:shp

Zákaz stání

Zákaz stání v rámci ZPS (např. vjezdy, boxy pro popelnice,...)

GeoJSON zip:dxfl zip:gml zip:shp

Vyhrazená stání pro invalidy - sdružená

Vyhrazená stání pro invalidy - sdružená (v rámci ZPS)

GeoJSON zip:dxfl zip:gml zip:shp

Parkovací automaty

Parkovací automaty v zónách placeného stání hl. m. Prahy

GeoJSON zip:dxfl zip:gml zip:shp



OPEN DATA BRATISLAVA

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NYC OpenData



CHICAGO
DATA PORTAL

Discussion - Q&A

1. Which issues can modern cities solve with IT in the coming years?
2. What should be done first in order to introduce IoT technology into cities' infrastructures?
3. What is your opinion on monitoring of public spaces?
4. What do you think about benefits versus risks these kinds of surveillance systems pose?
5. How can public access to data about the city make life in the area better?