Open APIs for Open Minds

IoT on the edge

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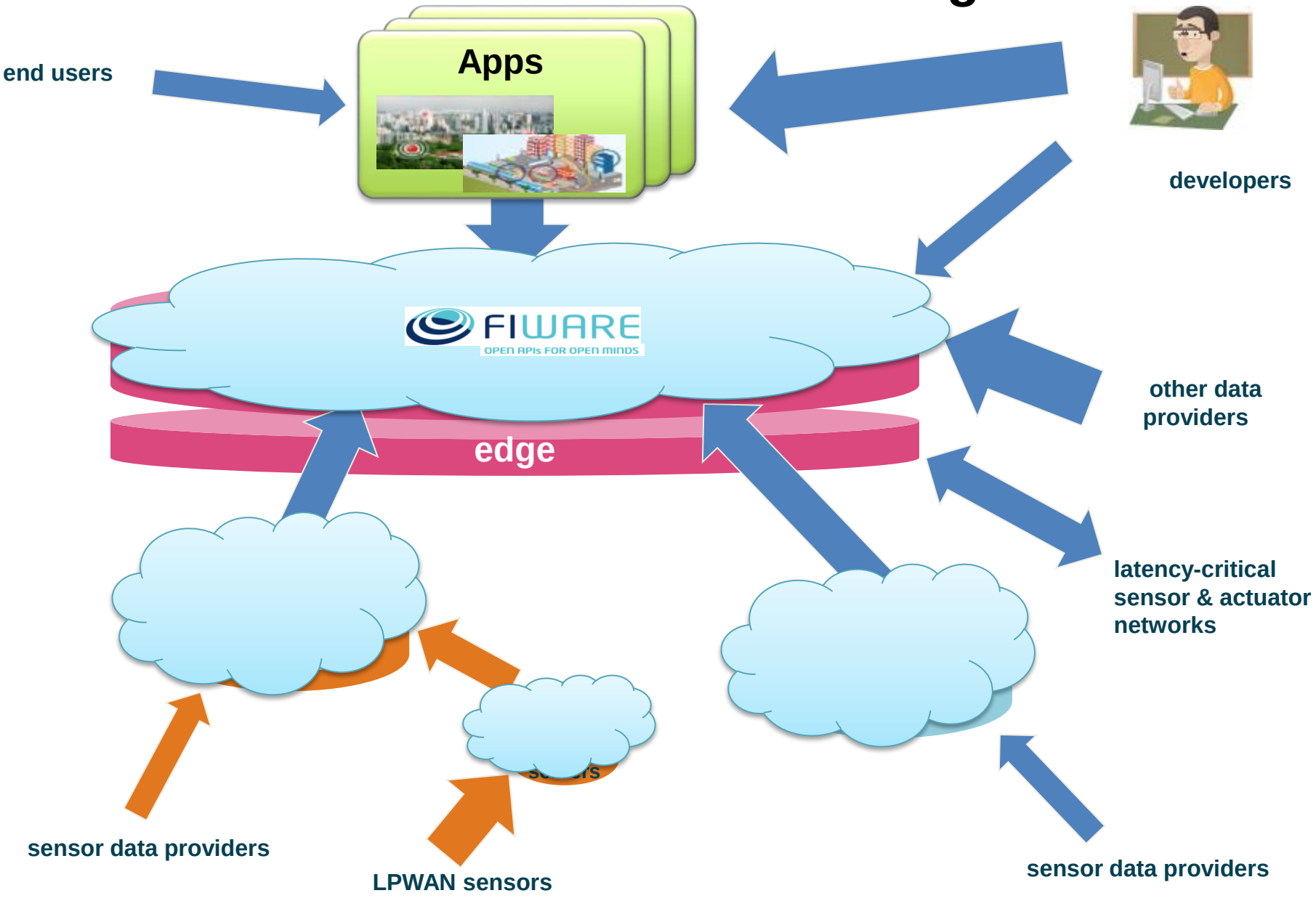
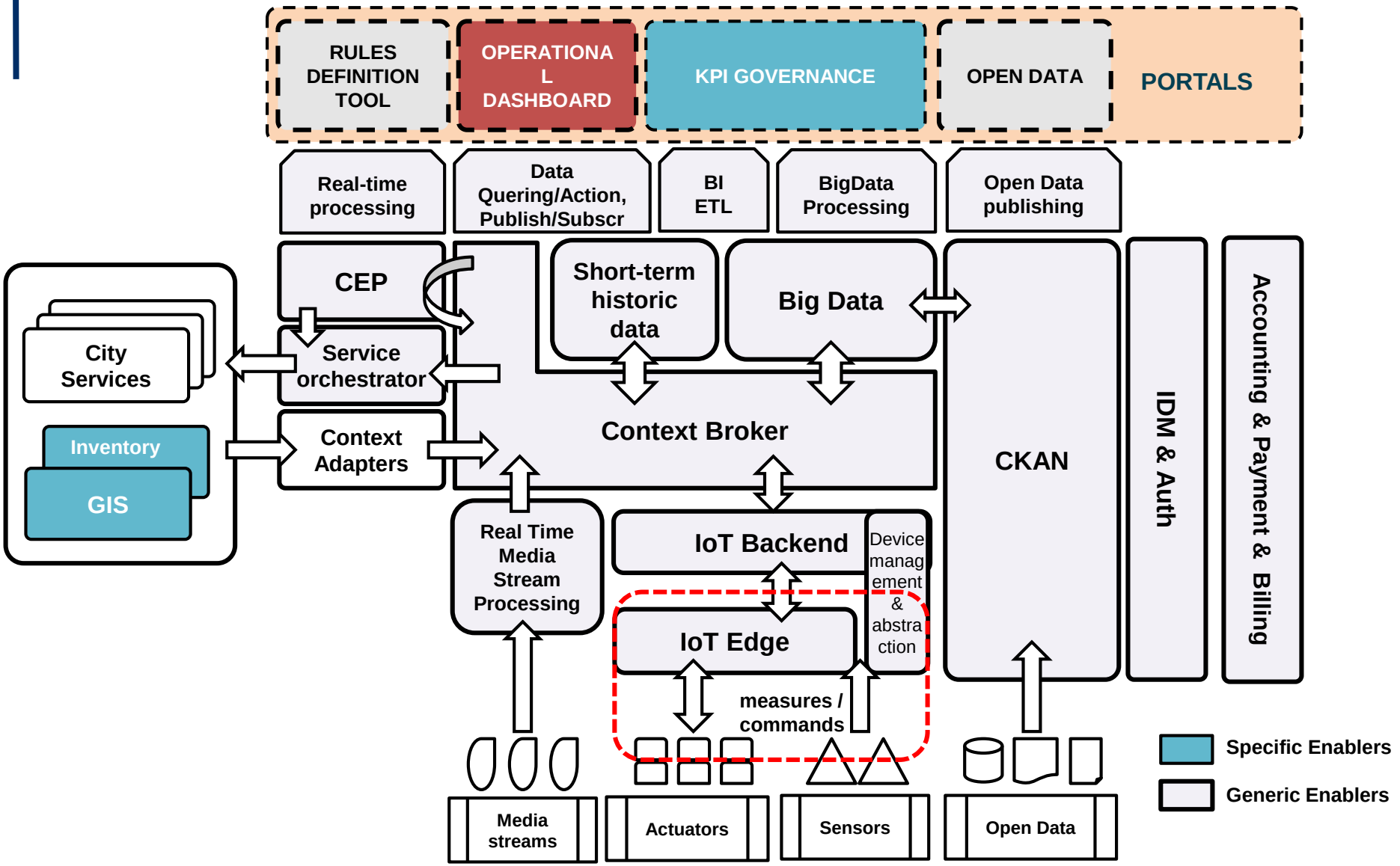
FIWARE in the cloud & in the edge



Smart City platform



Rationale for « edge » processing

- Address envisioned exponential growth in volume of sensor data
- Avoid wasteful use of networks for sending useless or noisy data to the cloud
- Filter, cleanse, aggregate, consolidate, vet data close to data sources
- Make up for imbalance between upward and downward data flows

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CEP for generic sensor data filtering & fusion

- sensor fusion used to a « black art » sub-domain of signal processing
- CEP offers a simple approach for the most basic types of
  - data cleansing
  - data selection
  - data normalization
  - feature extraction
  - ➢ not the mainstream use of CEP…

- less flexible and powerful than dedicated numeric processing
- yet easily programmable
- can be reconfigured on demand and,possibly, automatically

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Addressing requirements of *reactive* systems

- beyond those humdrum present-day IoT applications
  - mostly monitoring and data collection!
- beyond routine big data, beyond « fast data »!
- accounting for industrial cyber-physical systems applications that involve *control* of physical plant
  - applications that are “defined by their effect on the physical world”
  - time-response is NOT best-effort or part of QoS
  - mirroring the *state* of field systems in order to control them
  - no time lag between actual state and state maintained in model representation
  - bounded and deterministic return-trip times between field devices (sensors and actuators) and platform are mandatory

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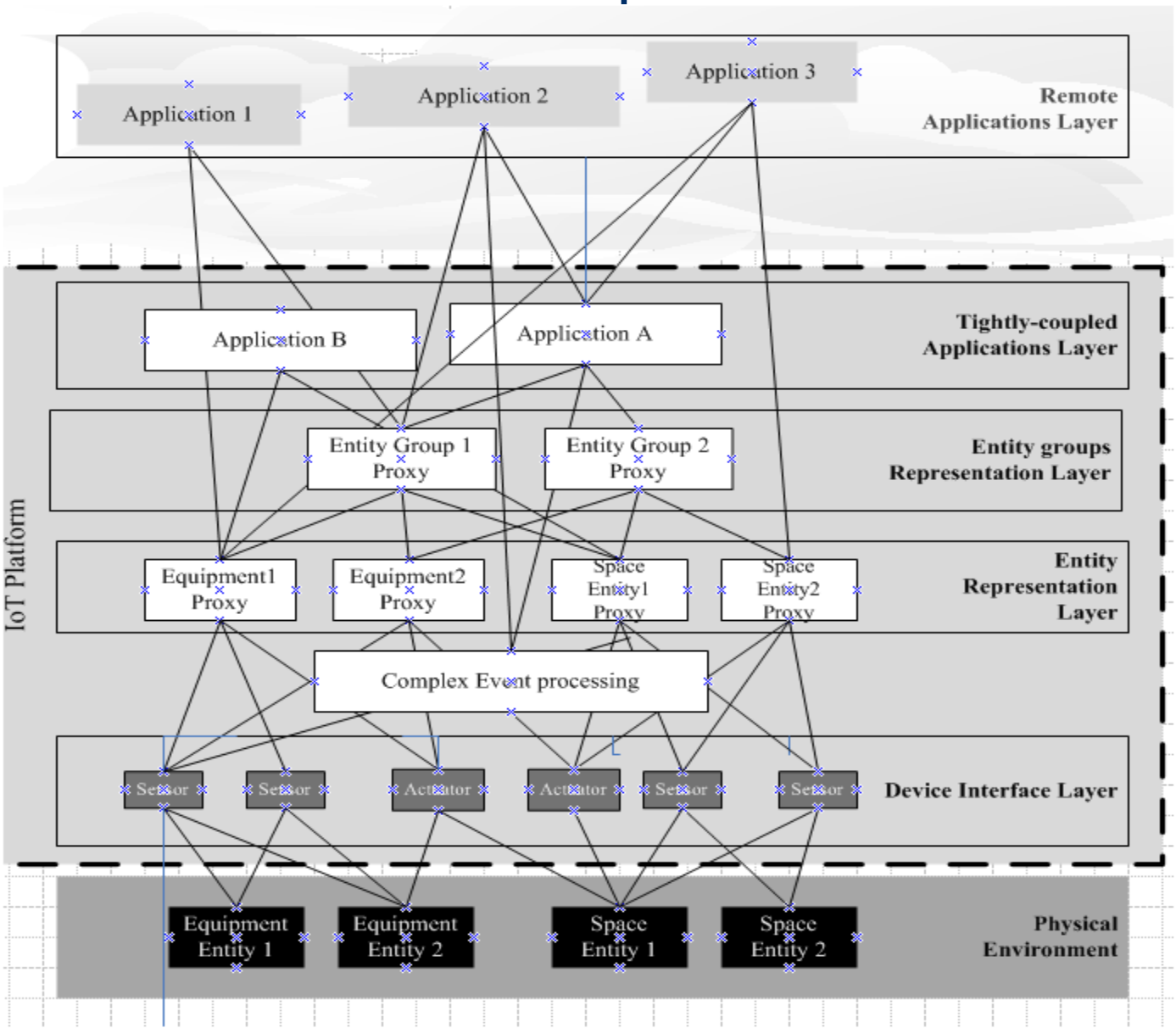
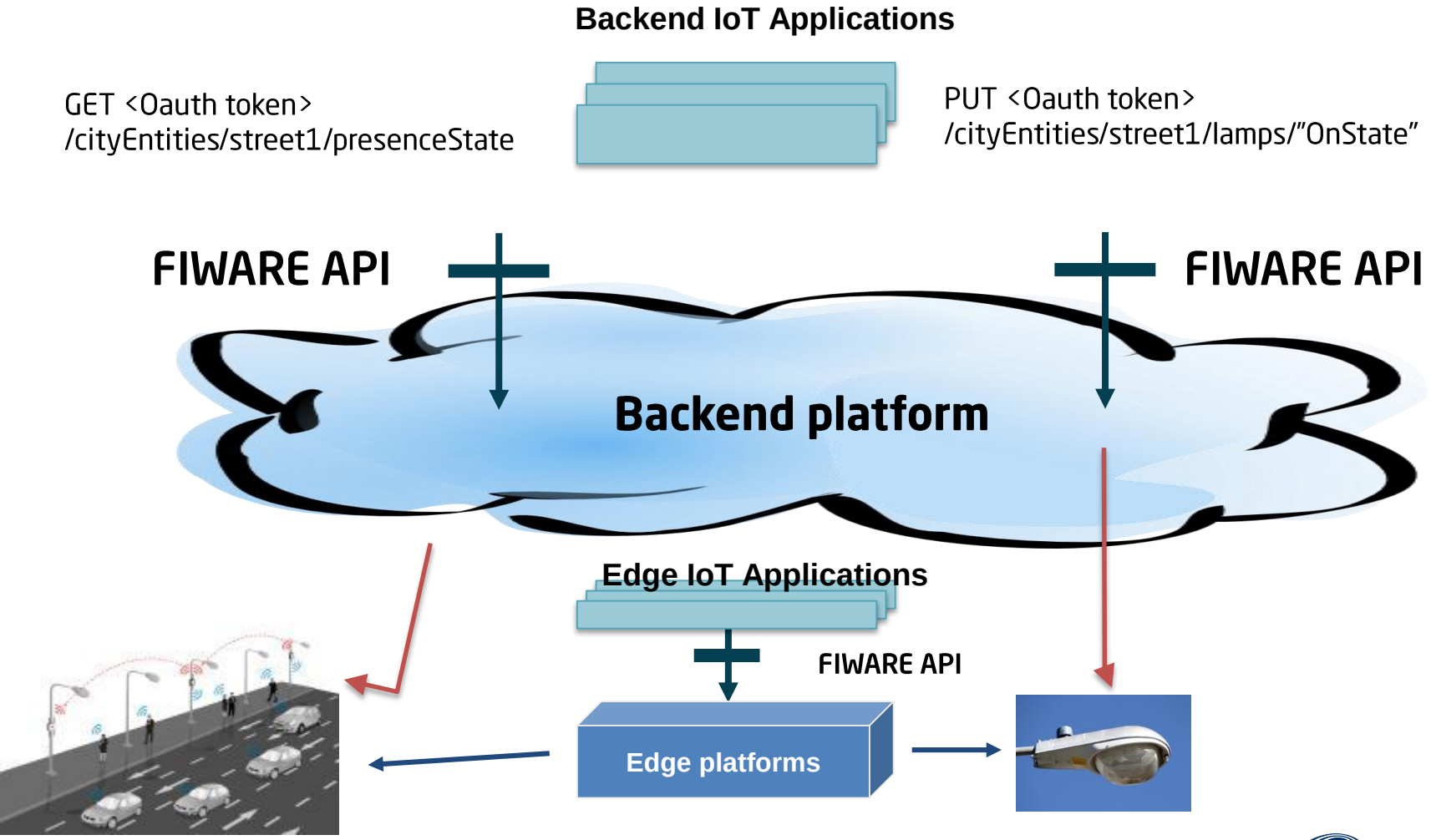
Architecture template for real-time IoT/CPS platform



Acting upon entities through devices

- IoT devices are acted upon through changes in the state of entites



IoT Data Edge Consolidation IDEC/Cepheus

- core engine derived from ESPER
- rules expressed in EPL (Event Processing Language)
- operates over 2 complementary windows:
  - sliding time window
  - spatial window (scope)

  - limited to « stateless » « along-the flow » processing
  - consolidation for

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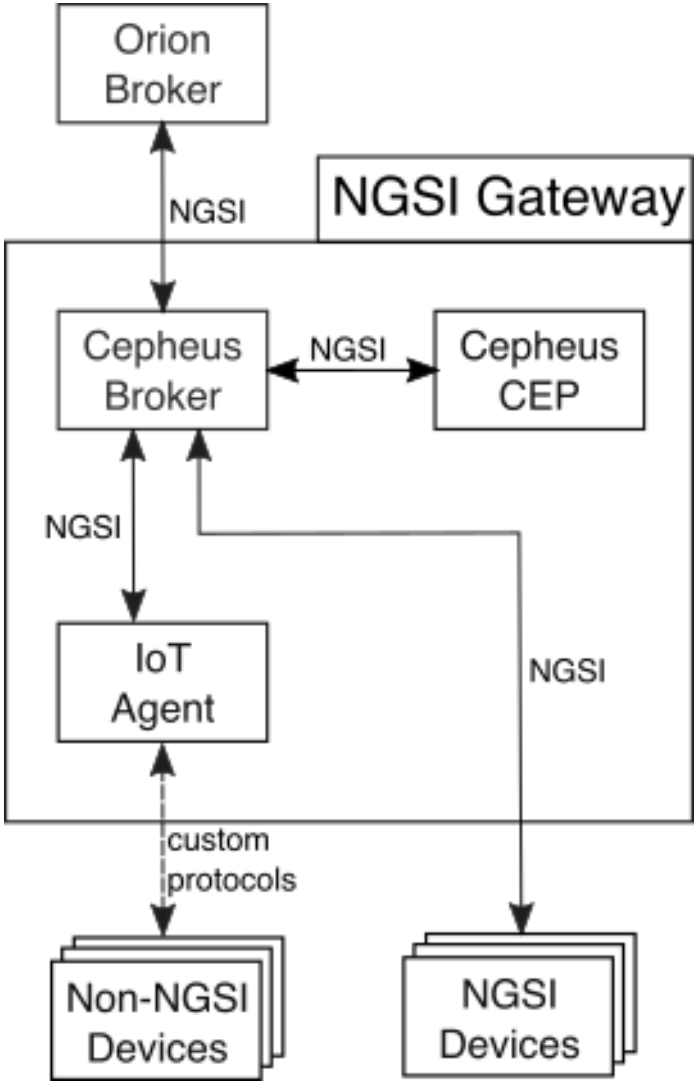
IDEC/Cepheus



Distributed FIWARE platform

- beyond « all-cloud » one size-fits-all approaches
- interim solutions before full-fledged « fog » platform ensures transparent and flexible distribution
  - fixed distribution between backend and edge
- edge platfrom could be hosted in :
  - operator NG-PoP (Next Generation Points of Presence)
  - customer-premises servers (e.g. for smart building, industry compounds)
  - LAN gateways
  - local embedded servers
    - Cepheus tested on raspberry-pi

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Thank you!

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