IoT, Big Data & Smart Cities

The Untold Story

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SENSORNETS 2015

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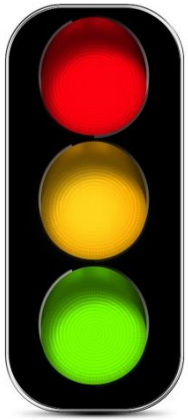
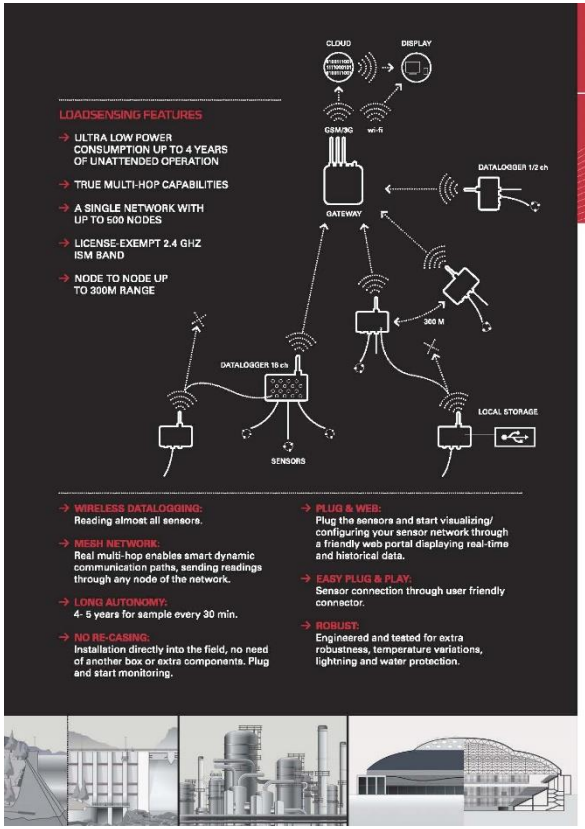
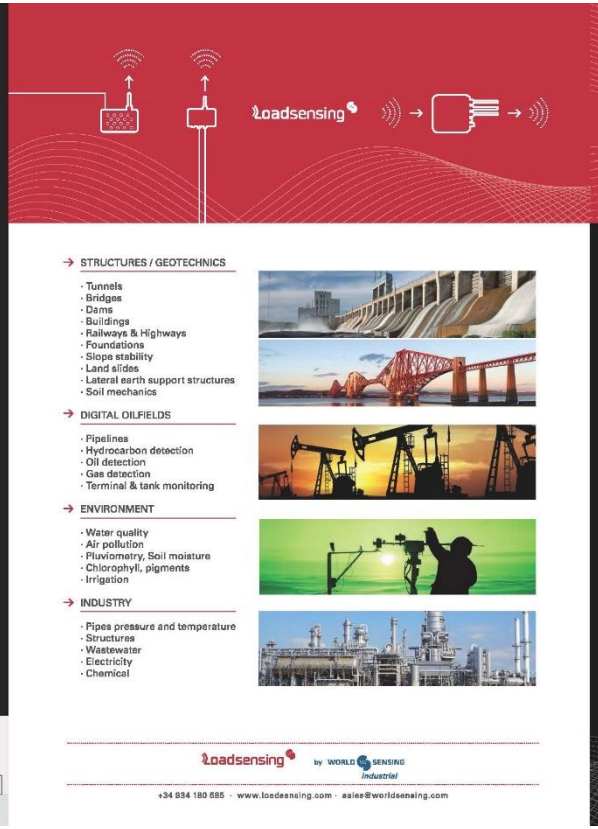
Smart City Applications

Smart Cities IoT/M2M Applications



Industrial IoT/M2M Applications



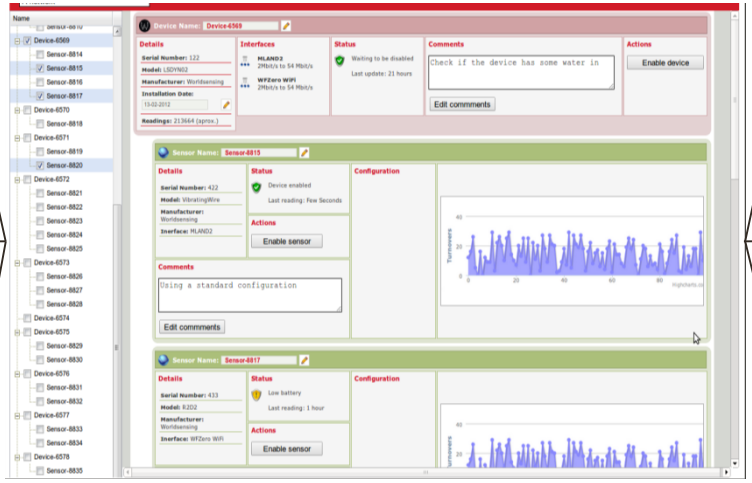


Today's Smart City Rollouts

Smart Parking

Smart Bins

Smart City Control Platform



Traffic Flow

Critical Infrastr.

Travel Time

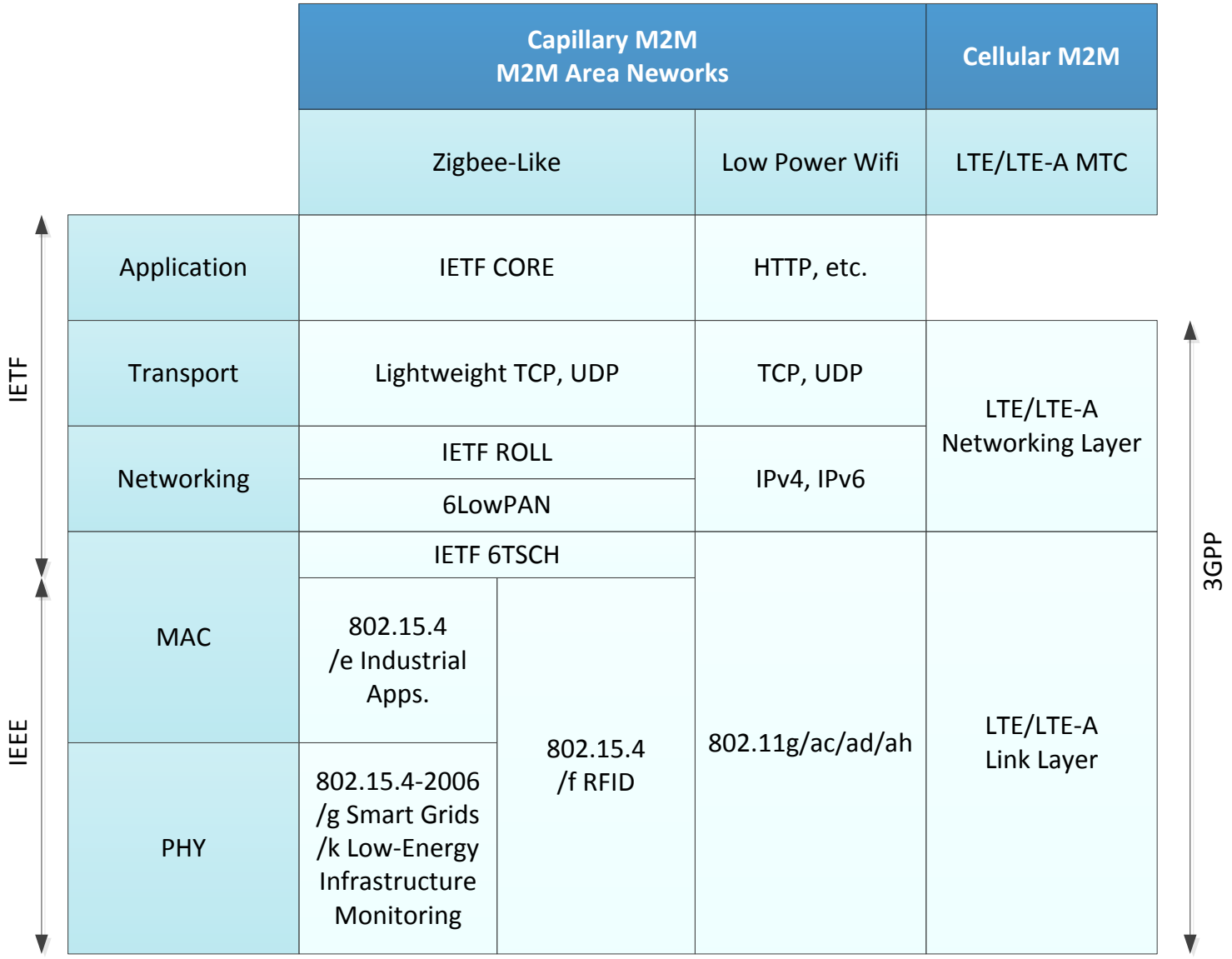
Historic Sites

Proven Technologies With Solid Deployment Track-Record Today!

2

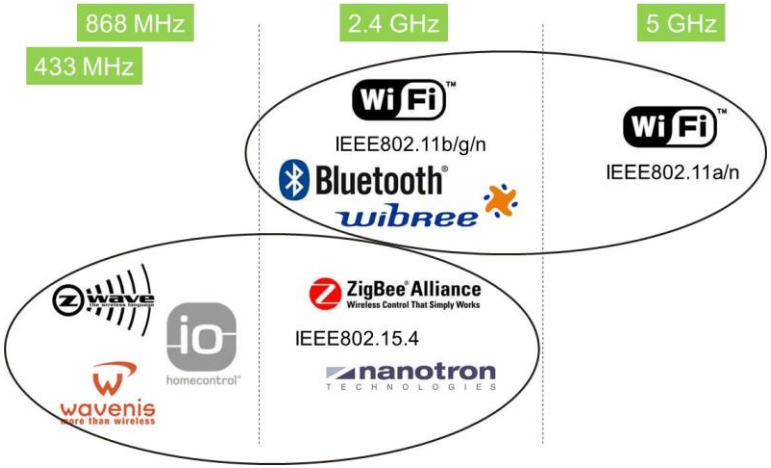
Data Access Technologies

Standardized M2M Protocol Stacks



Problems of ZigBee-like Solutions

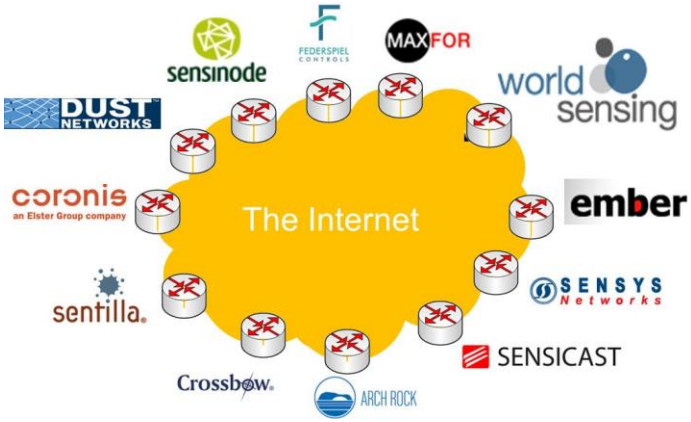
Interference in ISM



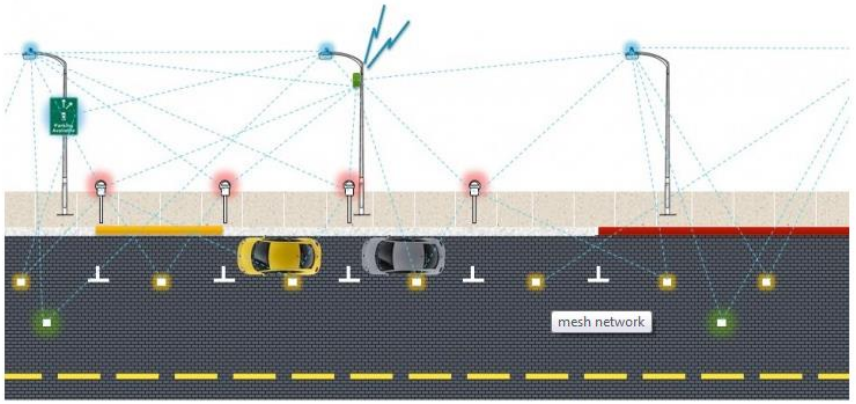
No Global Infrastructure

ZigBee® Alliance
Wireless Control That Simply Works

Lack of Interoperability



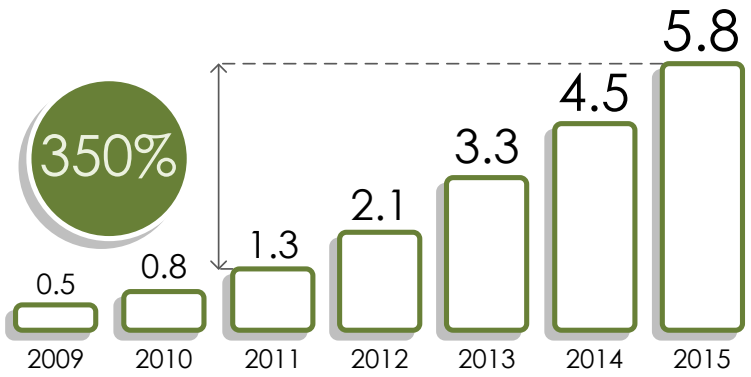
Higher Total Cost



Advantages of Low-Power WiFi

Ubiquitous Infrastructure

Number of Wi-Fi Public Hotspots in the World (in million), 2009-2015



Source: Wireless Broadband Access (WBA), Informa, Nov. 2011

Vibrant Standard

IEEE 802.11™

300 members

Wi Fi

Interference Management

NAV Medium Reservation

Sound Security

Advantages of LPWA M2M Networks

Large Coverage

Low Cost

Available Today

SIGFOX WIRELESS
REINVENT RADIO COMMUNICATION

SEMTECH

ONRAMP WIRELESS

neul

Operator Model

Current Eco-System

- **Sigfox** (market leader in Q1 2014):
  - technical: sub-GHz, UNB, very long range, one-way
  - business approach: operator, yearly license fee; Intel Ventures €10 million VC
- On-Ramp:
  - technical: 2.4GHz ISM band; “Random Phase Multiple Access”; 170dB link budget
  - business approach: equipment provider mainly; Managed Service SLA possible
- Cycleo (now Semtech):
  - technical: sub-GHz, CDMA-based, long range
  - business approach: equipment provider
- Neul:
  - technical: initially TVWS only; now shift into other bands too (notably licensed!)
  - business approach: originally only equipment; now SLA possible

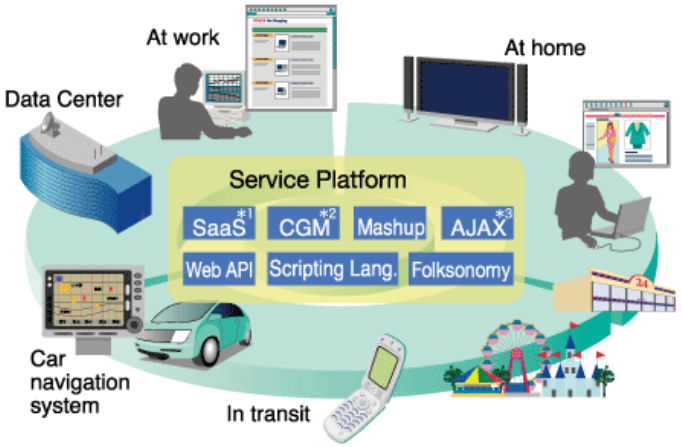
Advantages of Cellular M2M

Ubiquitous Coverage

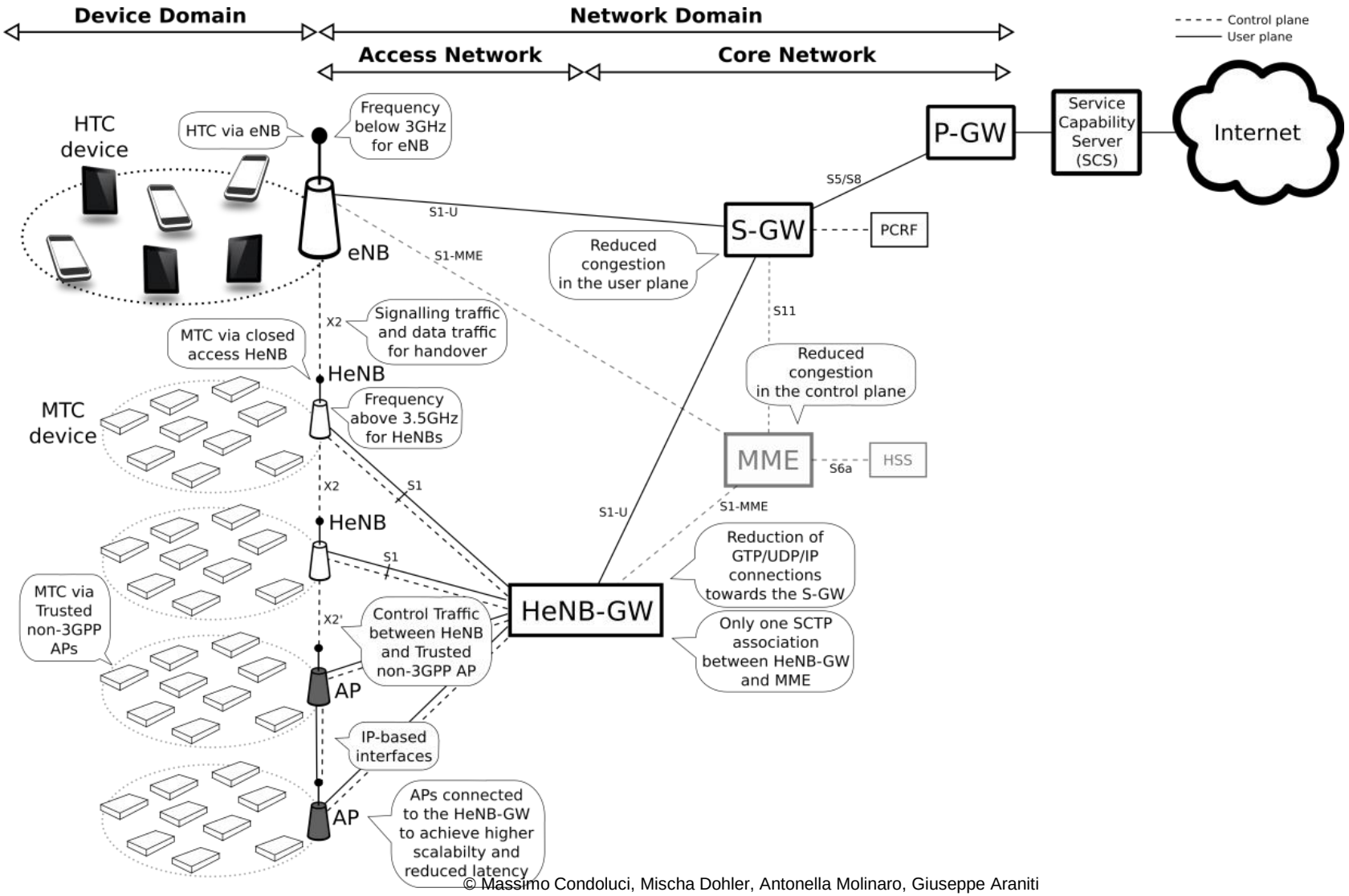
Mobility & Roaming

Interference Control

Service Platforms

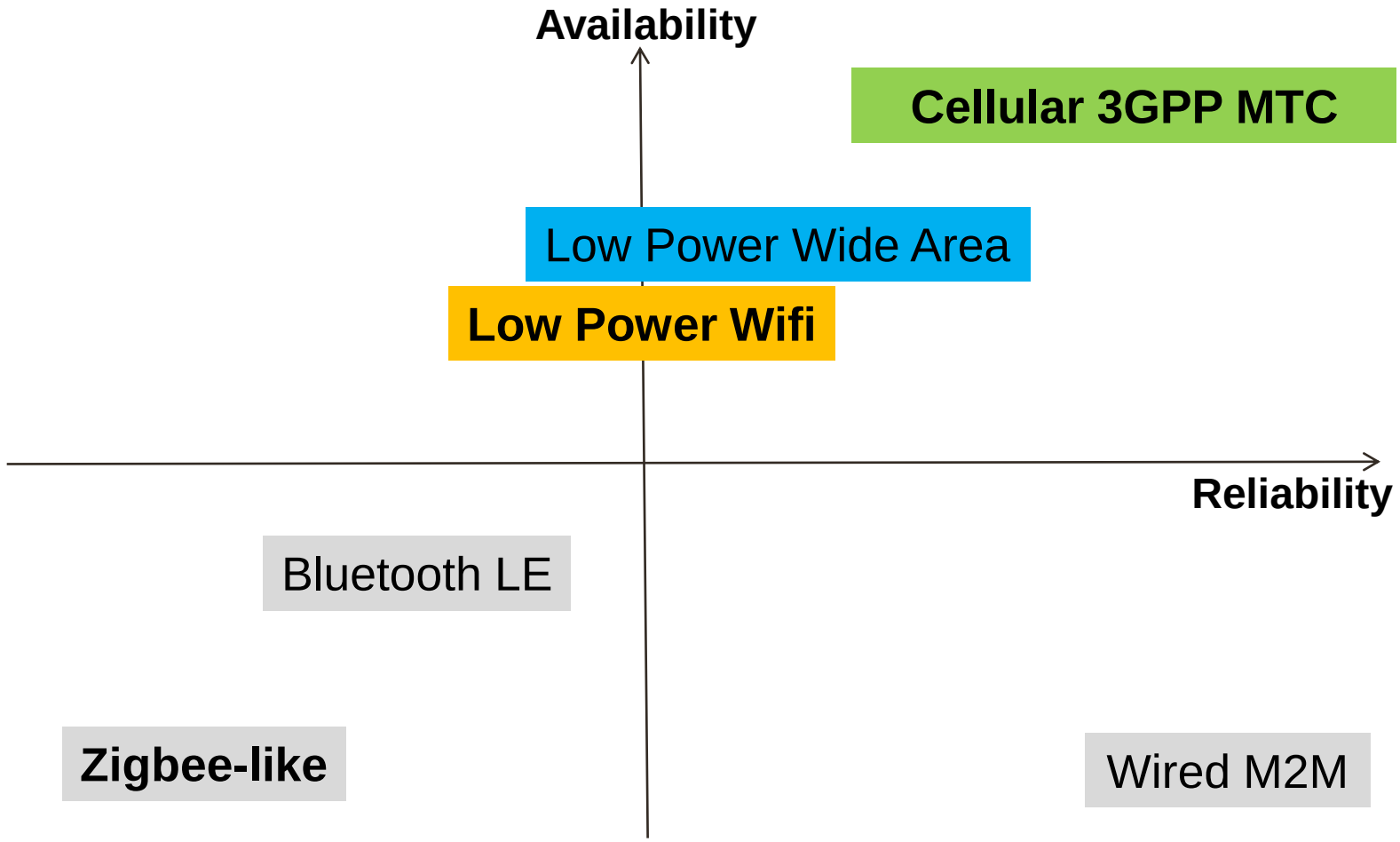


Towards a 5G Architecture



© Massimo Condoluci, Mischa Dohler, Antonella Molinaro, Giuseppe Araniti

M2M Prime Business Criteria



Availability = coverage, roaming, mobility, critical mass in rollout, etc.
Reliability = resilience to interference, throughput guarantees, low outages, etc.
(Total **Cost** of Ownership = CAPEX, OPEX.)

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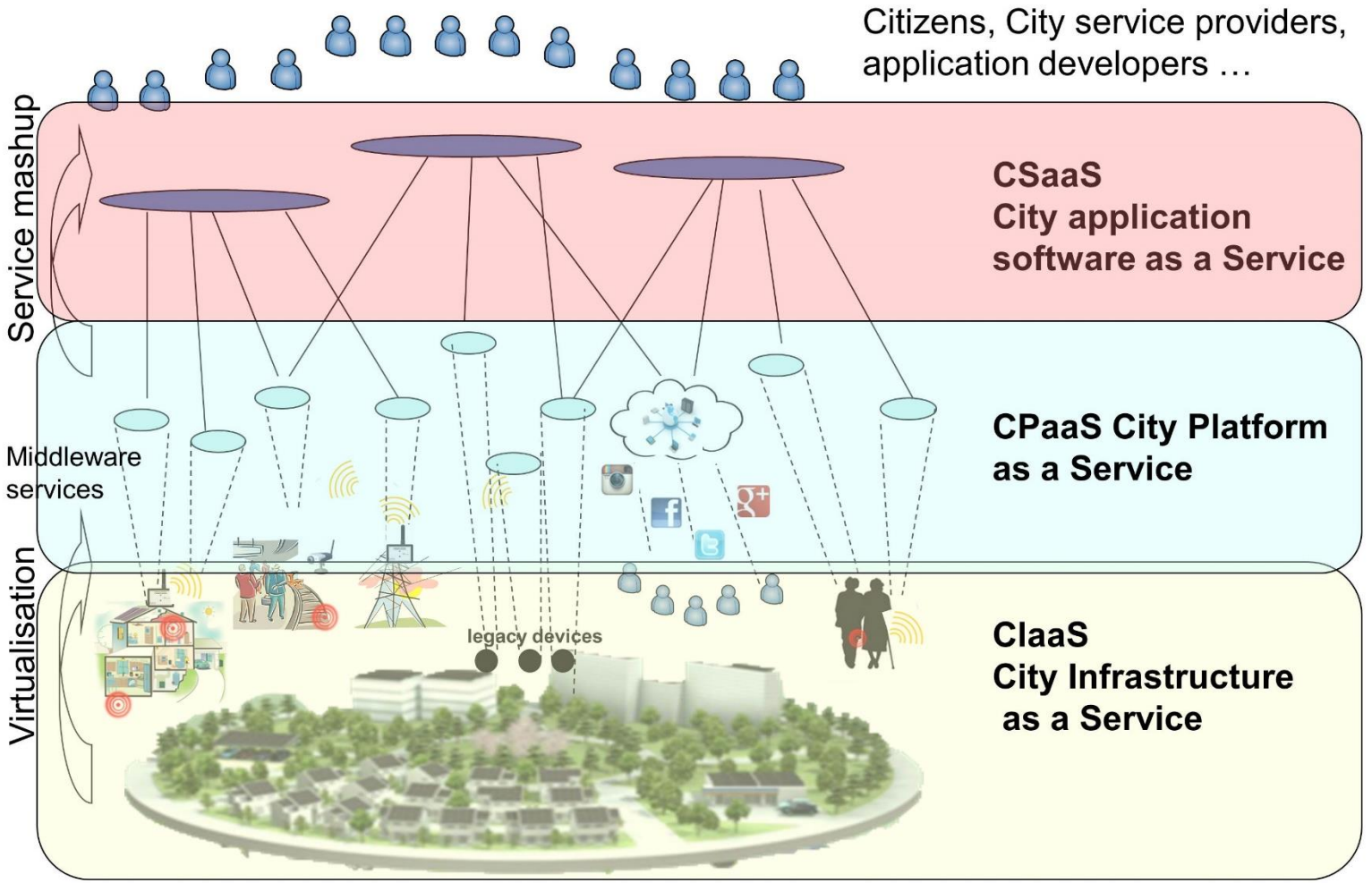
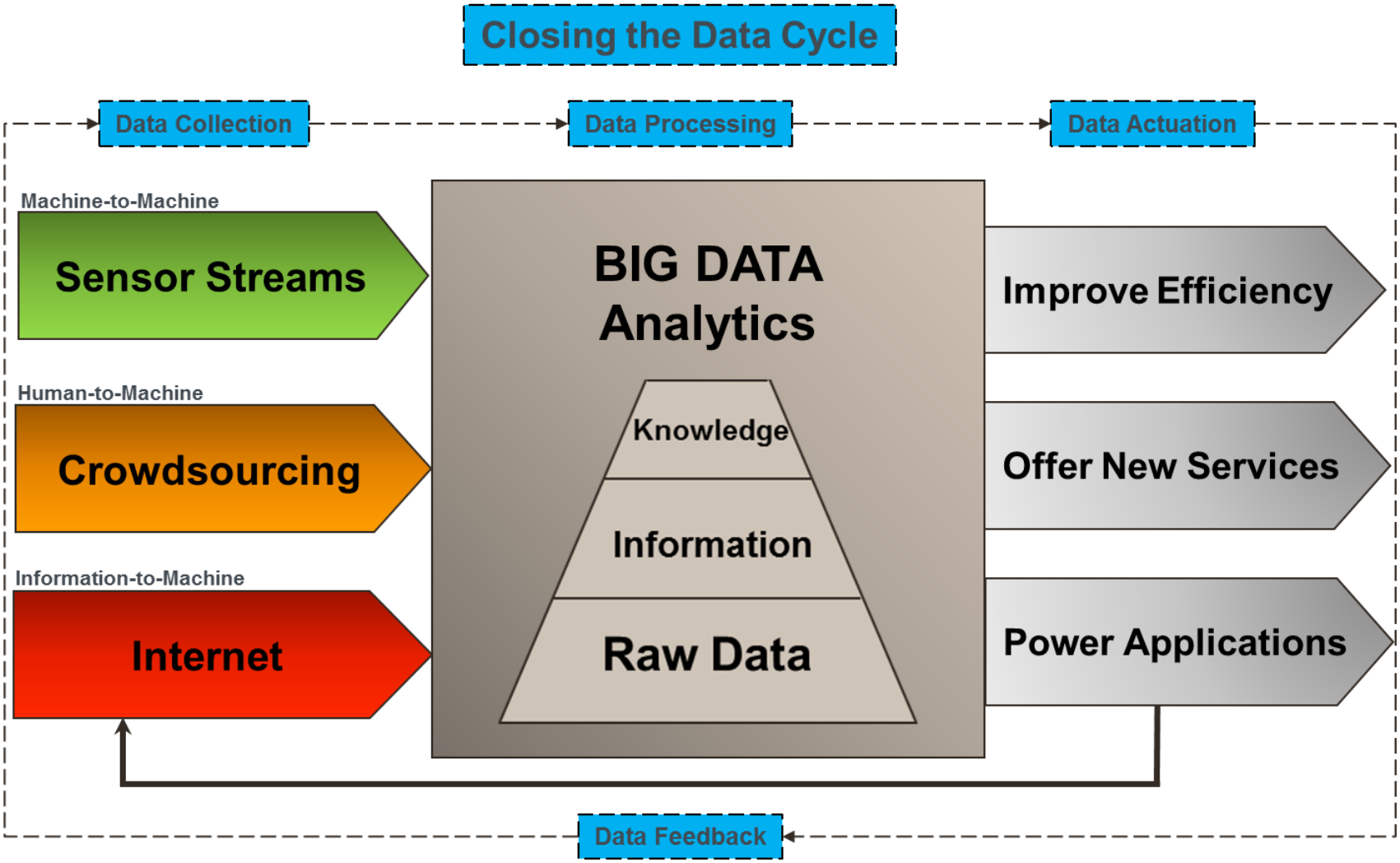
Virtualization, Data and Privacy

Virtualization & Cloudification



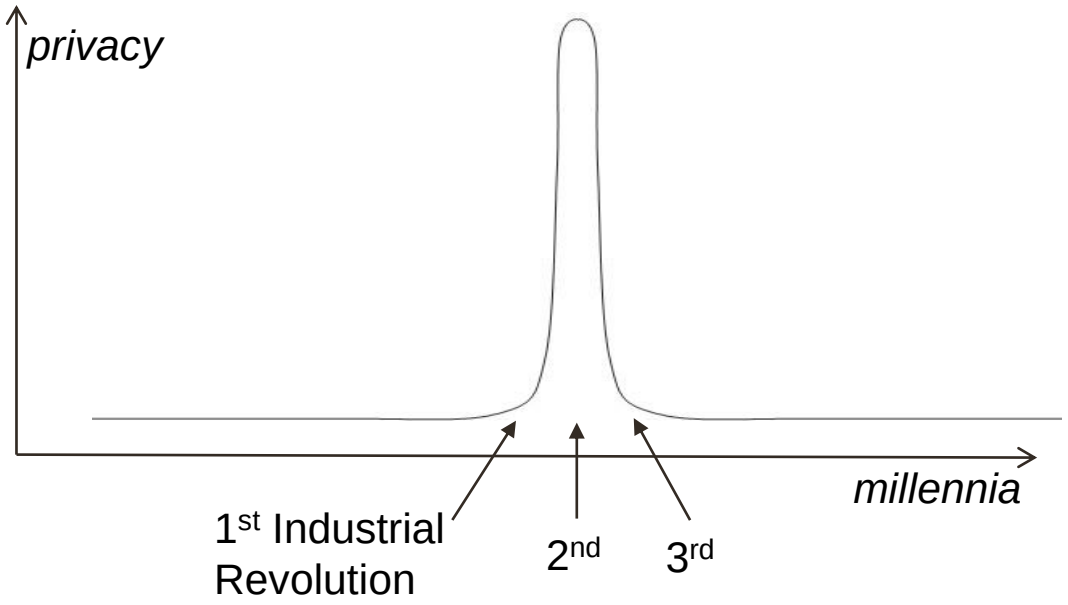
© http://clout-project.eu; partly also developed in ICT-VITRO

Closing the Data Cycle



Privacy – Illusion or Fundamental Right?

Data Privacy



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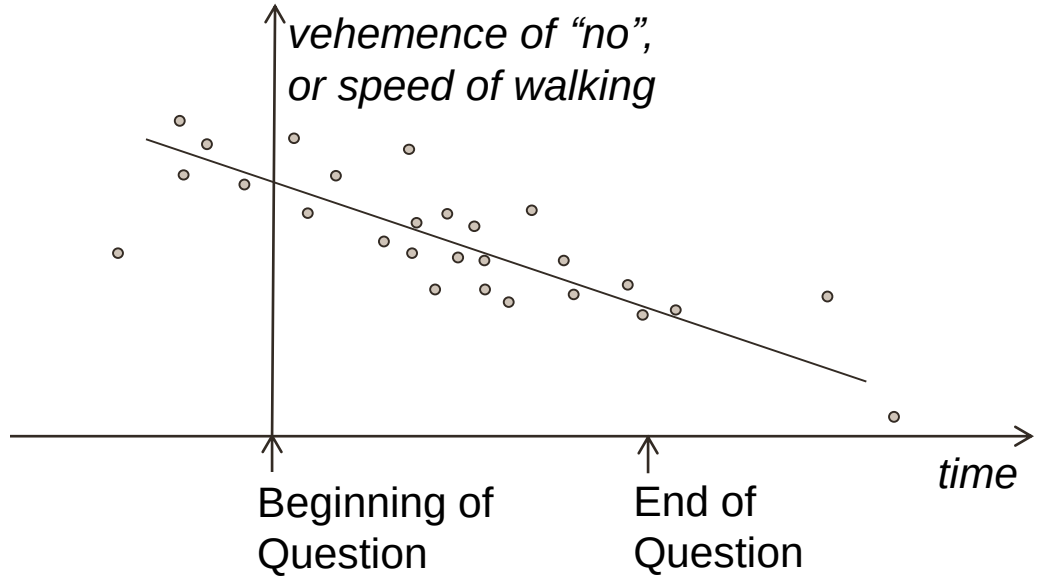
Concluding Remarks

Do citizens care about Smart Cities?

Smart City Big Data Insights

Really Surprising Outcome!



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