



IoT, Big Data & Smart Cities The Untold Story

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SENSORNETS 2015

Angers, France

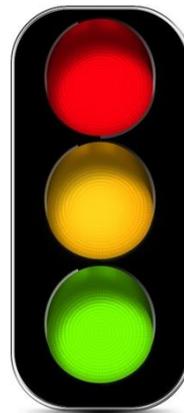
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Smart City Applications

Smart Cities IoT/M2M Applications



Industrial IoT/M2M Applications

LOADSENSING FEATURES

- **ULTRA LOW POWER CONSUMPTION** UP TO 4 YEARS OF UNATTENDED OPERATION
- **TRUE MULTI-HOP CAPABILITIES**
- **A SINGLE NETWORK WITH UP TO 500 NODES**
- **LICENSE EXEMPT 2.4 GHZ ISM BAND**
- **NODE TO NODE UP TO 500M RANGE**

WIRELESS DATALOGGING:
Reading almost all sensors.

MESH NETWORK:
Real multi-hop enables smart dynamic communication paths, sending readings through any node of the network.

LONG AUTONOMY:
4- 5 years for sample every 30 min.

NO RE-CASING:
Installation directly into the field, no need of another box or extra components. Plug and start monitoring.

PLUG & WEB:
Plug the sensors and start visualizing/configuring your sensor network through a friendly web portal displaying real-time and historical data.

EASY PLUG & PLAY:
Sensor connection through user friendly connector.

ROBUST:
Engineered and tested for extra robustness, temperature variations, lightning and water protection.



DATASHEET

LoadSensing
by WORLD SENSING Industrial

→ **STRUCTURES / GEOTECHNICS**

- Tunnels
- Bridges
- Dams
- Buildings
- Railways & Highways
- Foundations
- Slope stability
- Land slides
- Lateral earth support structures
- Soil mechanics

→ **DIGITAL OILFIELDS**

- Pipelines
- Hydrocarbon detection
- Oil detection
- Gas detection
- Terminal & tank monitoring

→ **ENVIRONMENT**

- Water quality
- Air pollution
- Fluvimetry, Soil moisture
- Chlorophyll, pigments
- Irrigation

→ **INDUSTRY**

- Pipes pressure and temperature
- Structures
- Wastewater
- Electricity
- Chemical

WORLDSENSING INTRODUCES THE LS WIRELESS DATALOGGING SYSTEM: COMBINING EASE OF USE WITH INDUSTRY LEADING PERFORMANCE.

LS DATALOGGERS READ 95% OF THE SENSORS IN THE MARKET, PROVIDING REMOTE MONITORING AND REAL-TIME DATA OF YOUR INFRASTRUCTURE.

LOADSENSING SIMPLIFIES INSTRUMENTATION DEPLOYMENTS, MINIMISING INSTALLATION AND MAINTENANCE COSTS.

→ **WIRELESS MONITORING FINALLY USEFUL FOR THE REAL INSTRUMENTATION WORLD**

→ **BI-DIRECTIONAL COMMUNICATION GIVES REMOTE CONFIGURATION CAPABILITIES**

→ **SMART AUTO-ORGANISED SENSOR NETWORKS**

→ **ROBUST EQUIPMENT READY FOR HARSH ENVIRONMENTS**

LoadSensing by WORLD SENSING Industrial

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Today's Smart City Rollouts

Smart Parking

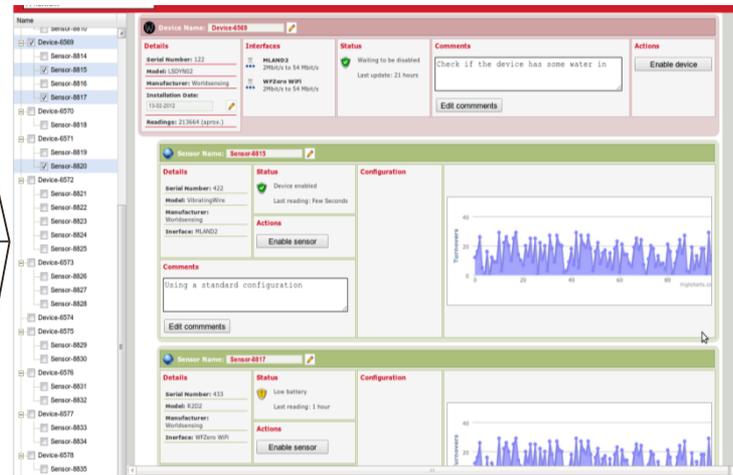


© Worldsensing

Smart Bins



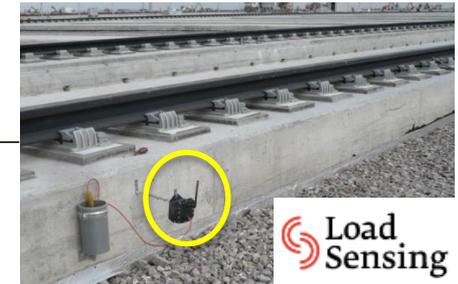
Smart City Control Platform



Traffic Flow



Critical Infrastr.



Travel Time



**Proven Technologies
With Solid Deployment
Track-Record Today!**

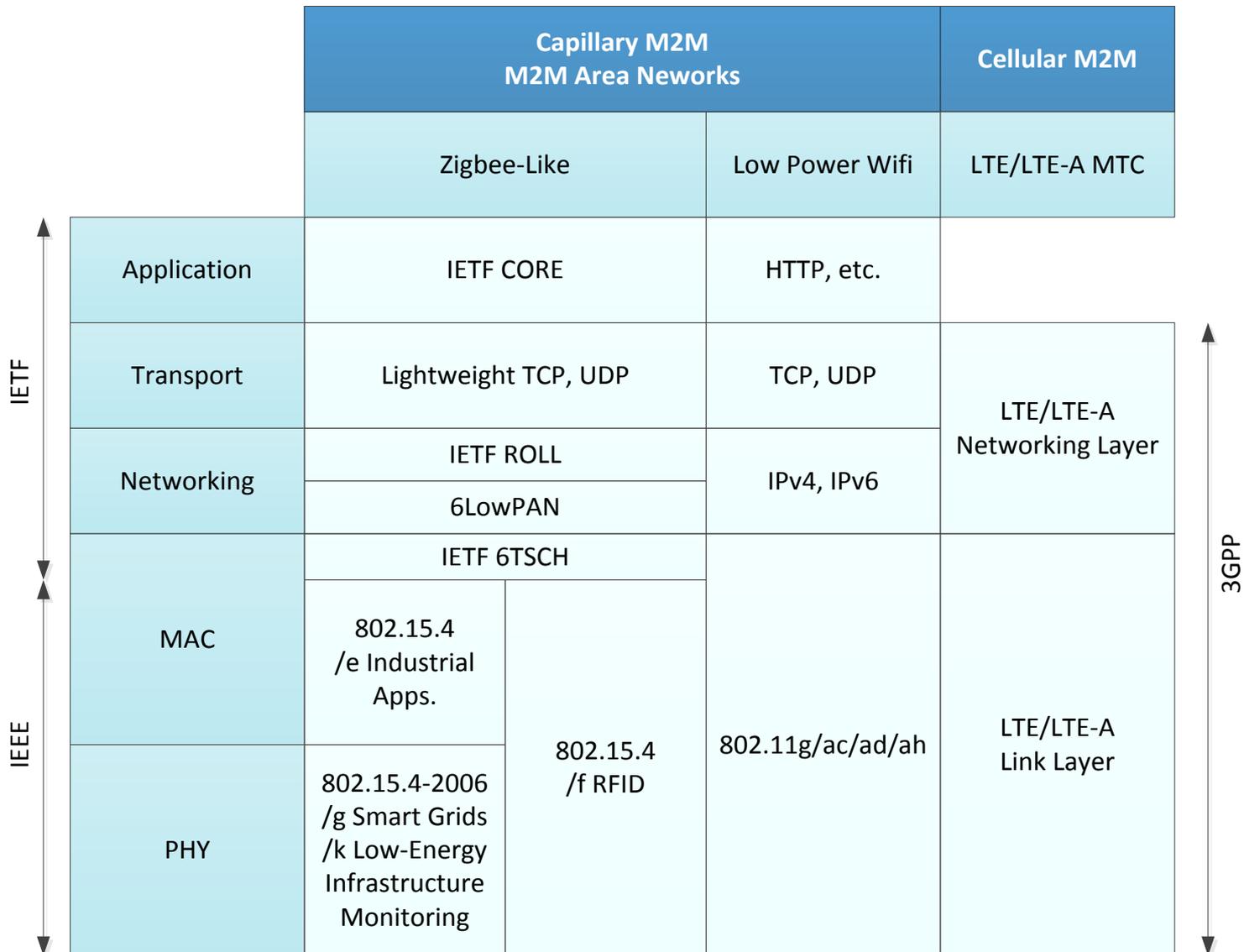
Historic Sites



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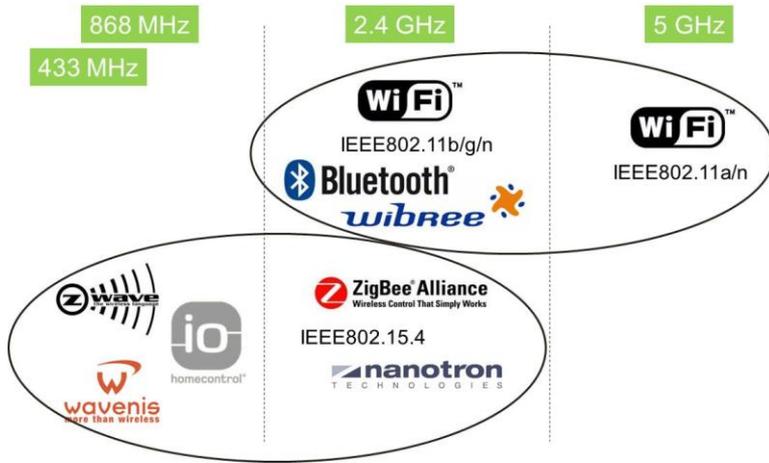
Data Access Technologies

Standardized M2M Protocol Stacks



Problems of ZigBee-like Solutions

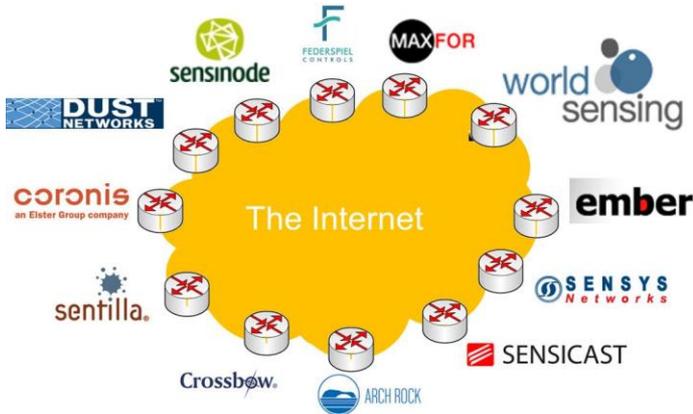
Interference in ISM



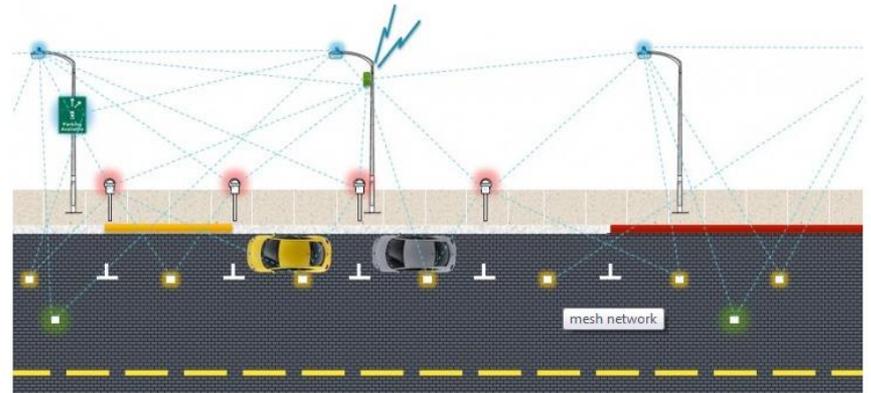
No Global Infrastructure



Lack of Interoperability



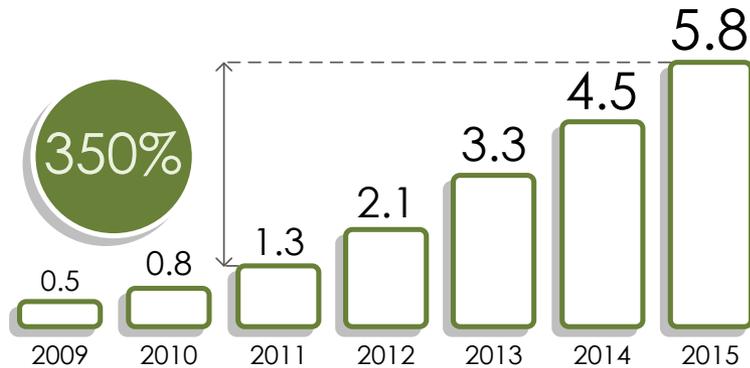
Higher Total Cost



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

Interference Management



NAV Medium
Reservation

Vibrant Standard

IEEE
802.11™

300 members



Sound Security



WPA2/PSK/TLS/SSL

Advantages of LPWA M2M Networks

Large Coverage



Low Cost



Available Today



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



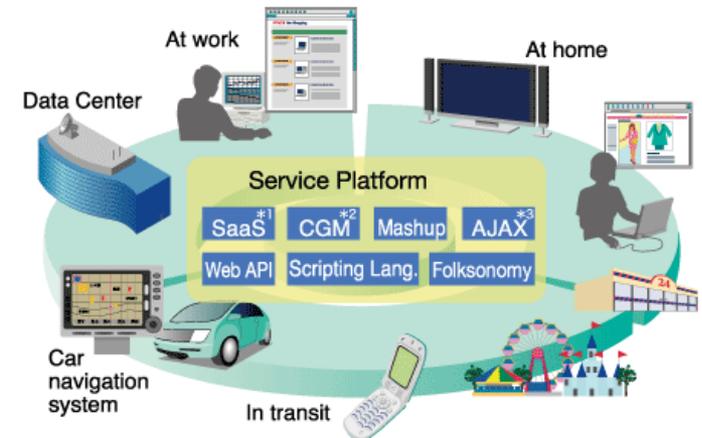
Mobility & Roaming



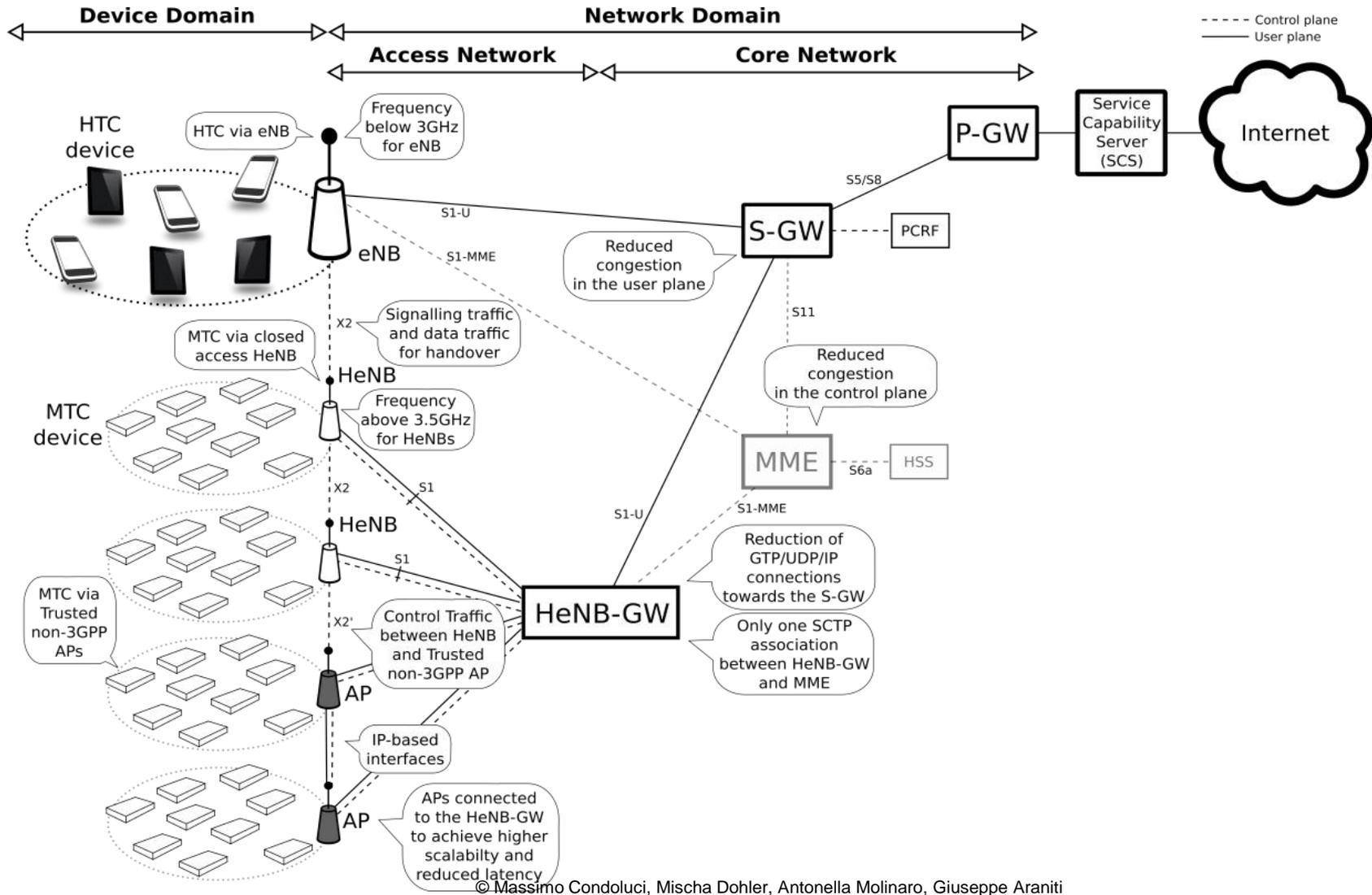
Interference Control



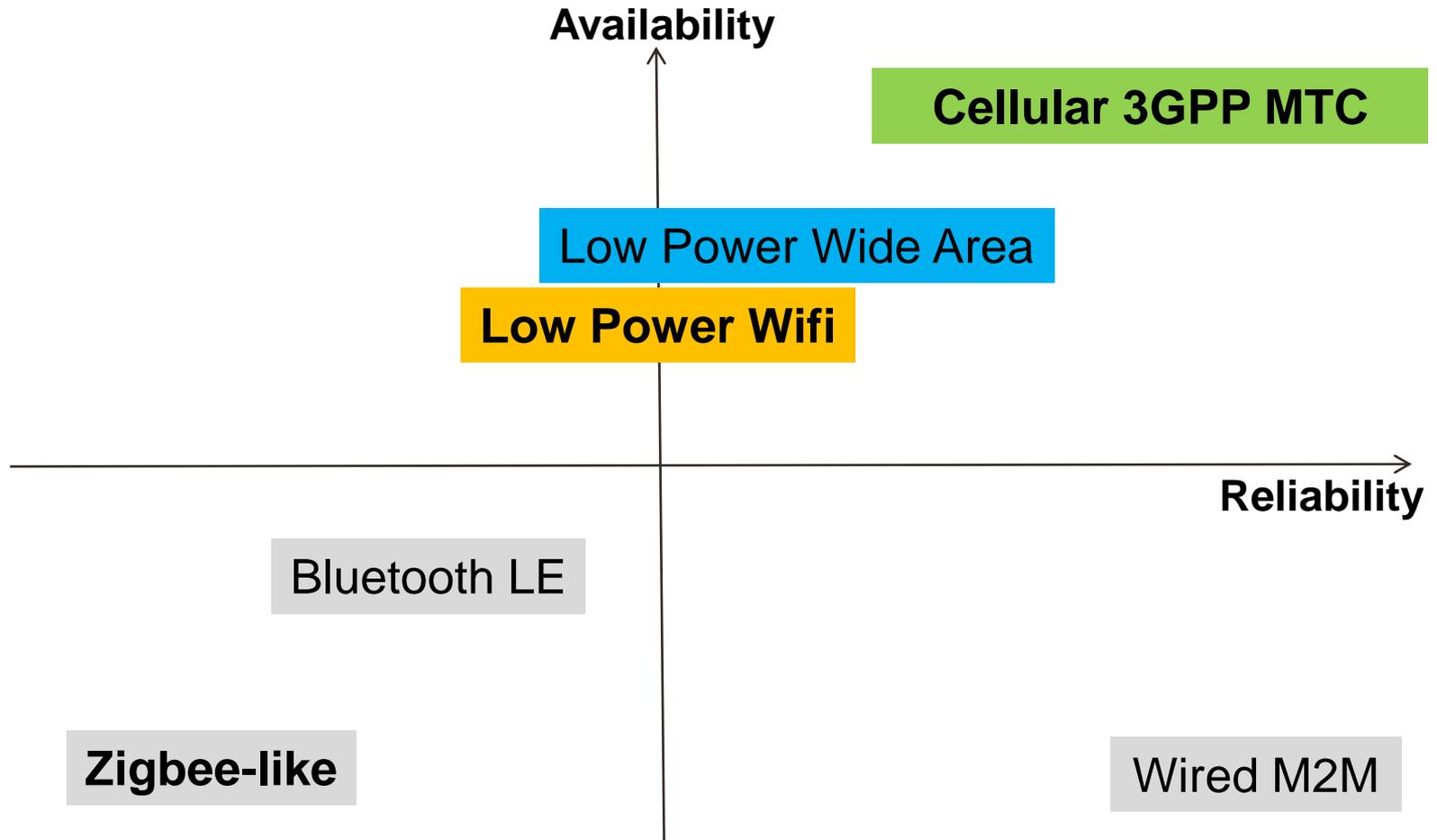
Service Platforms



Towards a 5G Architecture



M2M Prime Business Criteria



Availability = coverage, roaming, mobility, critical mass in rollout, etc.

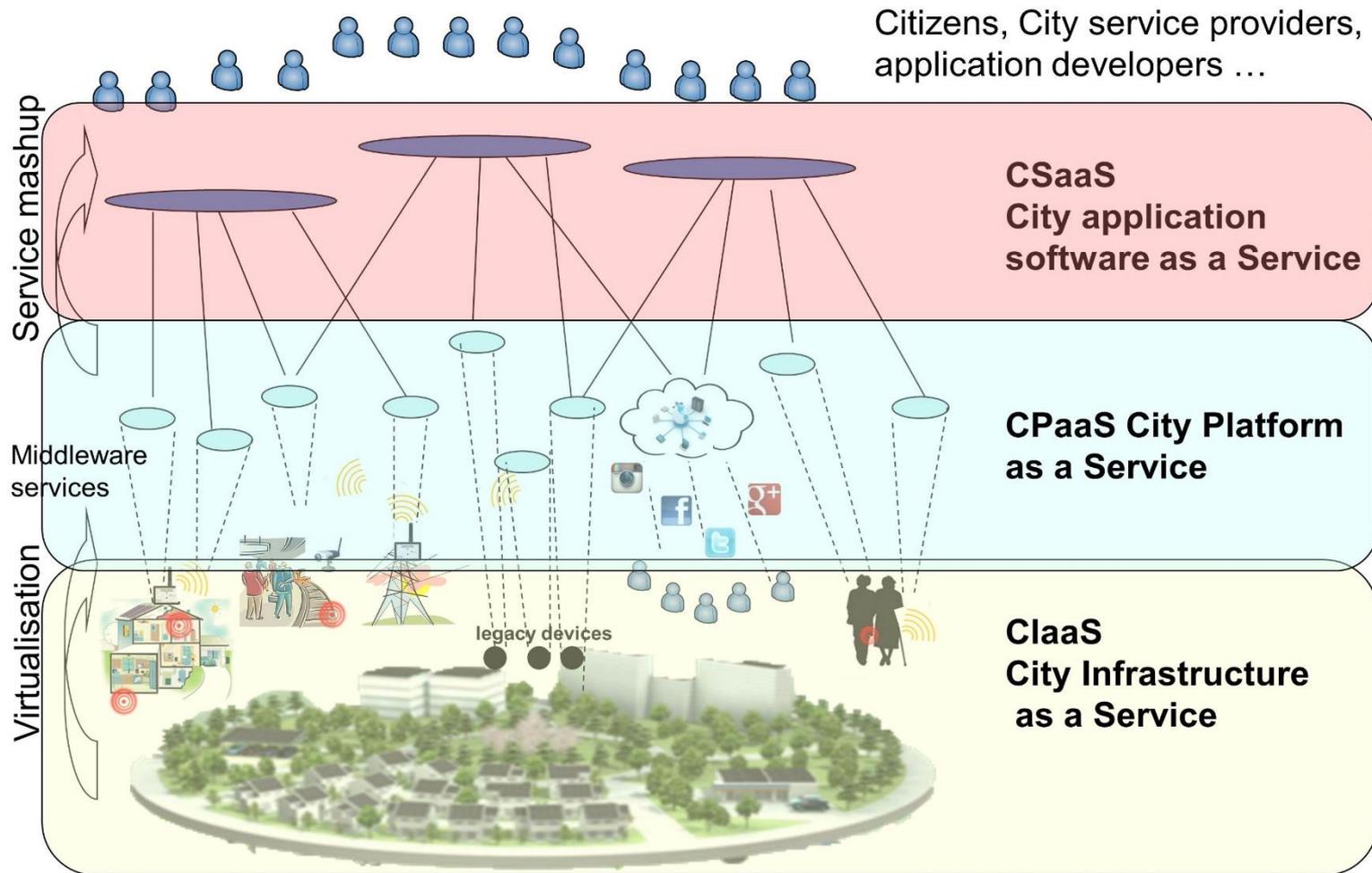
Reliability = resilience to interference, throughput guarantees, low outages, etc.

(Total **Cost** of Ownership = CAPEX, OPEX.)

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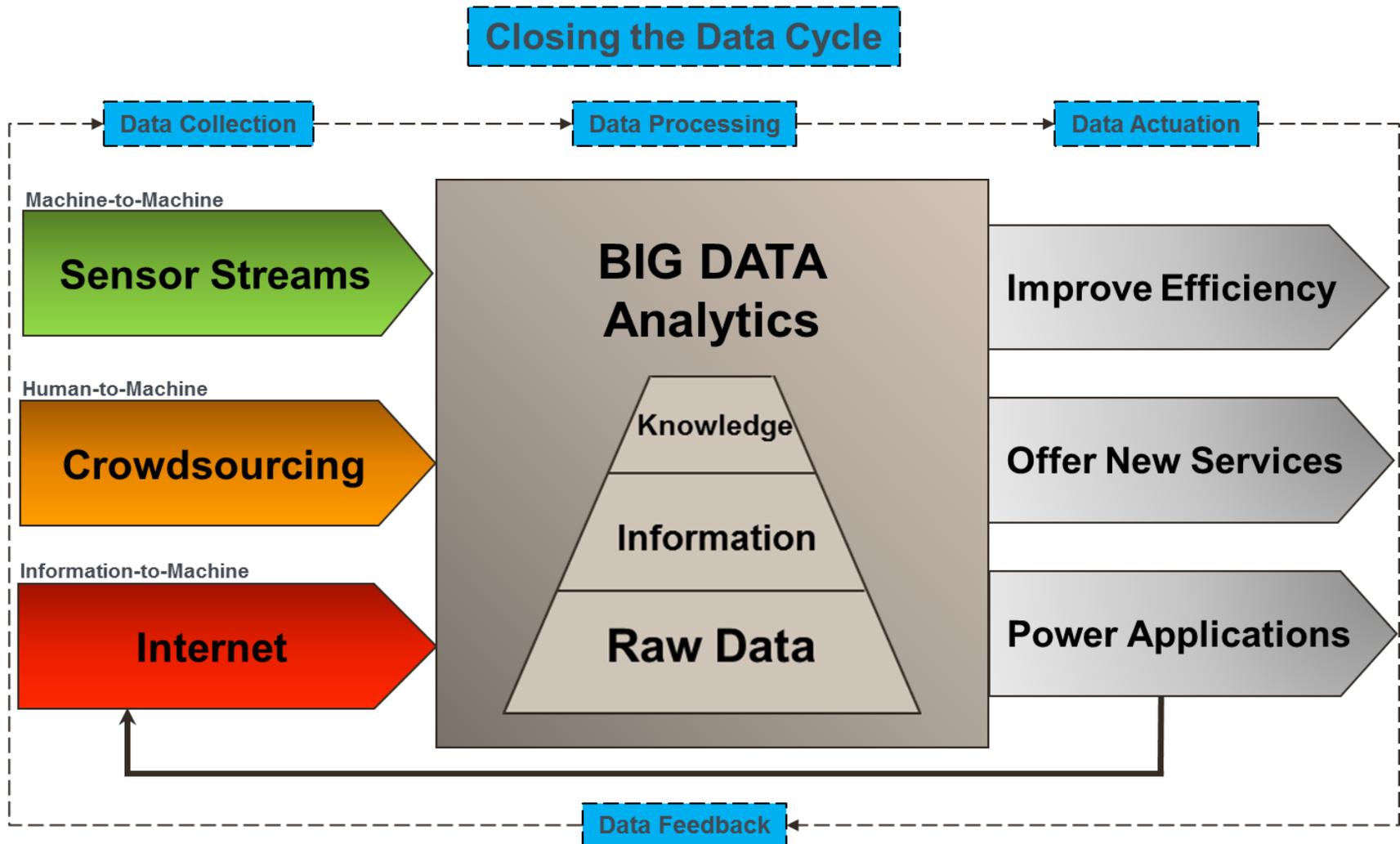
Virtualization, Data and Privacy

Virtualization & Cloudification



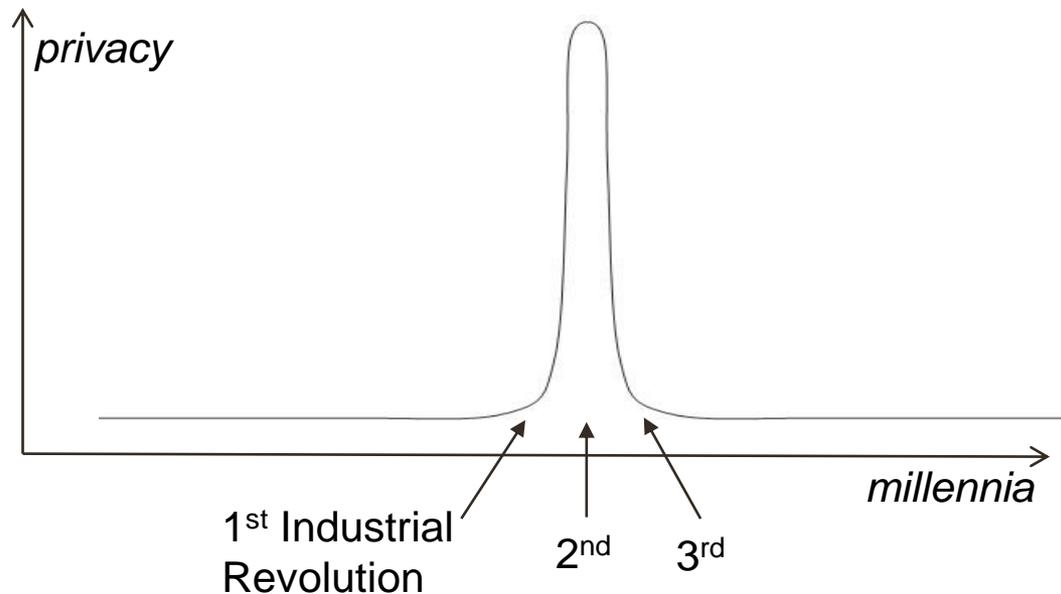
© <http://clout-project.eu>; partly also developed in ICT-VITRO

Closing the Data Cycle



Privacy – Illusion or Fundamental Right?

Data Privacy



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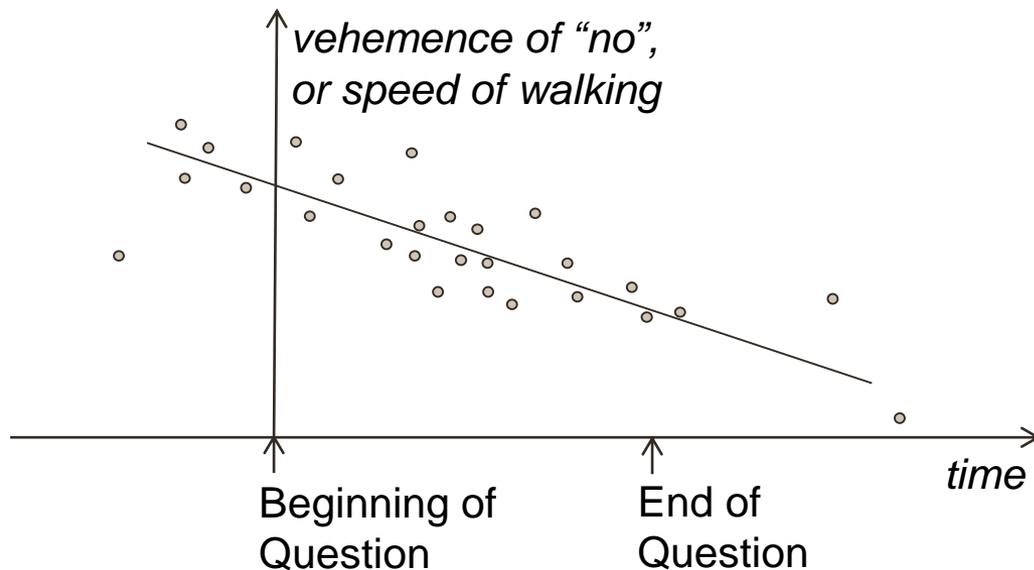
Concluding Remarks

Do citizens care about Smart Cities?



Smart City Big Data Insights

Really Surprising Outcome!





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