INTRODUCTION TO ONEM2M
ONEM2M FEATURES, EVOLUTION, APP TO SMART CITY

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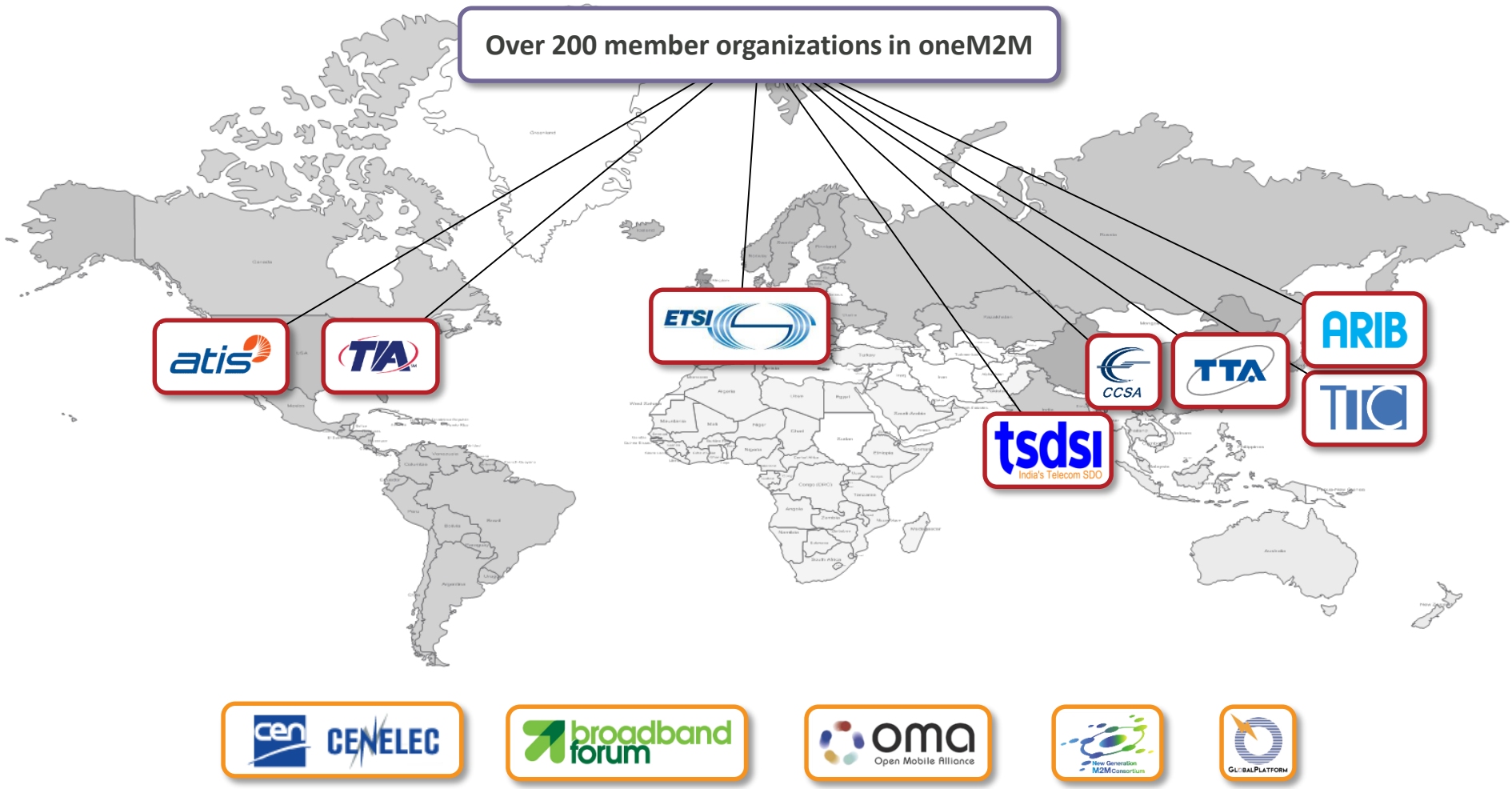
oneM2M www.oneM2M.org

oneM2M Partnership Project



www.oneM2M.org

All document are publically available

M2M Common Service Layer in a nutshell

A software “framework”

Located between the M2M applications and
communication HW/SW that provide connectivity

Provides functions that M2M applications
across different industry segments commonly need
(eg. data transport, security/encryption, remote software update...)

Like an “Android” for the Internet of Things
But it sits both on the field devices/sensors and in servers
And it is a standard – not controlled by a single private company

Strong implementation base

Industry-driven Open source implementations

LAAS-CNRS

Fraunhofer FOKUS

KETI

CISCO

OM2M Connecting things

open mtc

OCEAN

OPEN DAYLIGHT

IotDM

Examples of Commercial implementations /demos

LG

सी-डॉट C-DOT

सेंटर फॉर डेवलपमेंट ऑफ टेलीमैटिक्स
भारत सरकार का दूरसंचार प्रौद्योगिकी केन्द्र
Centre for Development of Telematics
Telecom Technology Centre of Govt. Of India

PILOT THINGS

SIERRA WIRELESS

InterDigital

QUALCOMM

kt

HUAWEI

SK telecom

sensinov
Global IoT Platform

MODACOM

LG U+

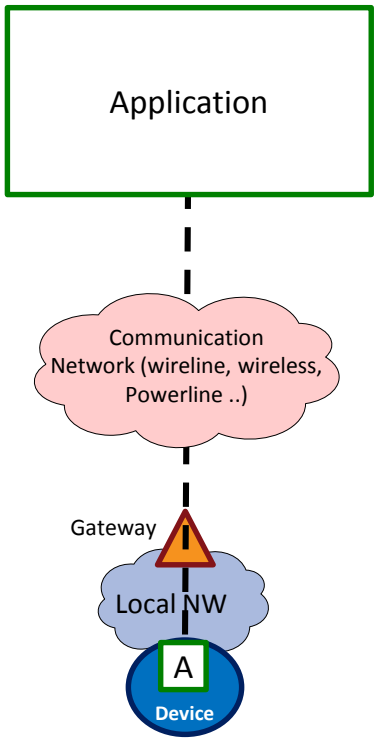
Hewlett Packard Enterprise

4 interop. events so far

oneM2M Architecture approach

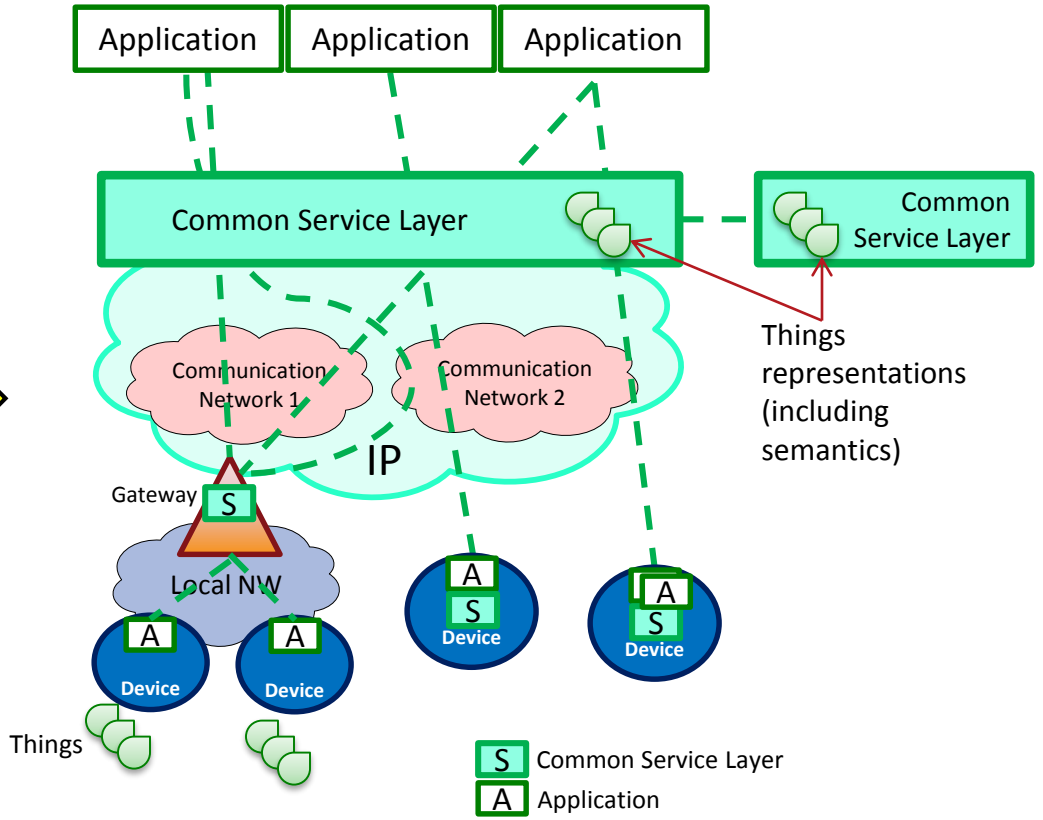
Pipe (vertical):

1 Application, 1 NW,
1 (or few) type of Device
Point to point communications

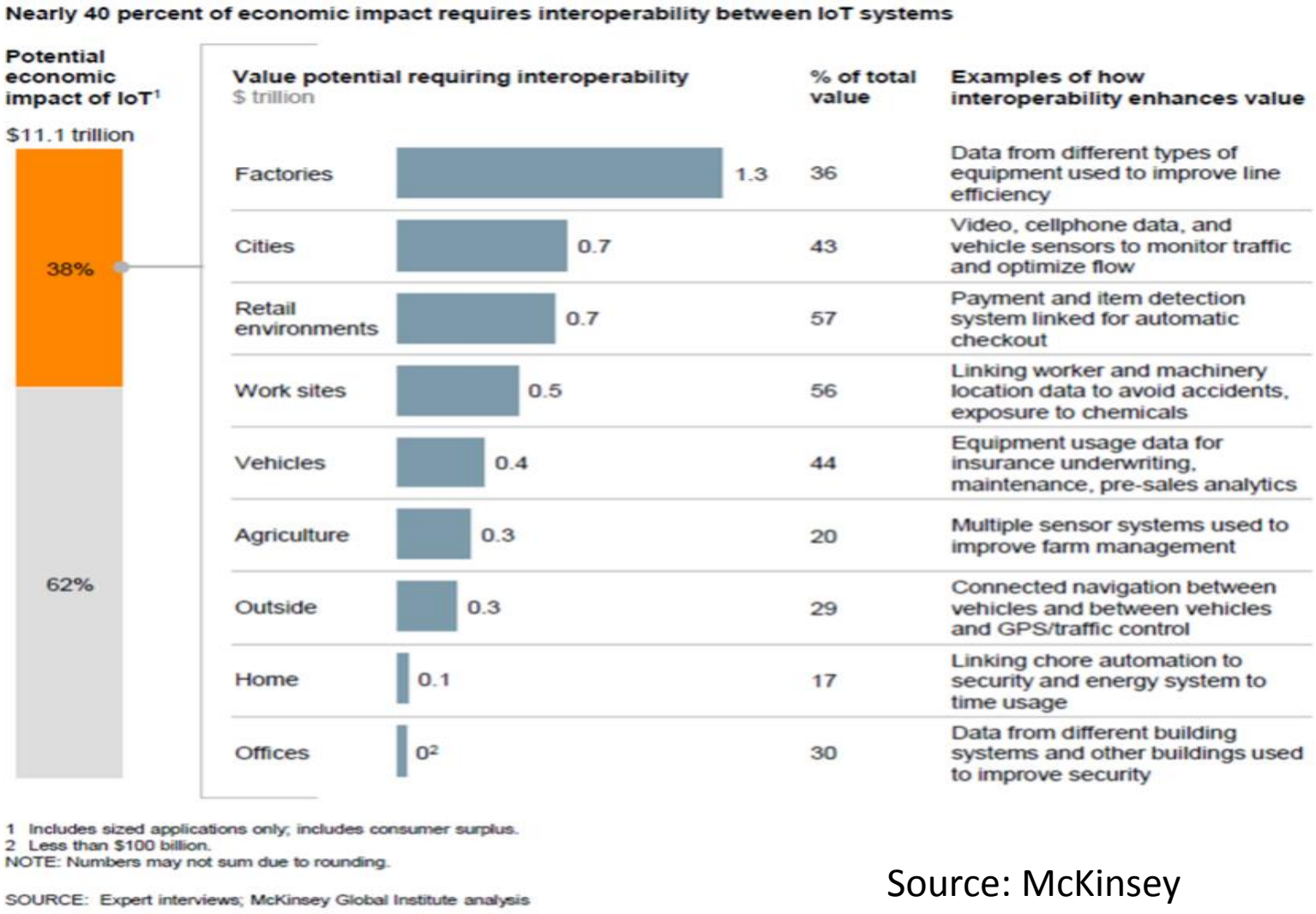


Horizontal (based on common Layer)

Applications share common service and network infrastructure
Multipoint communications

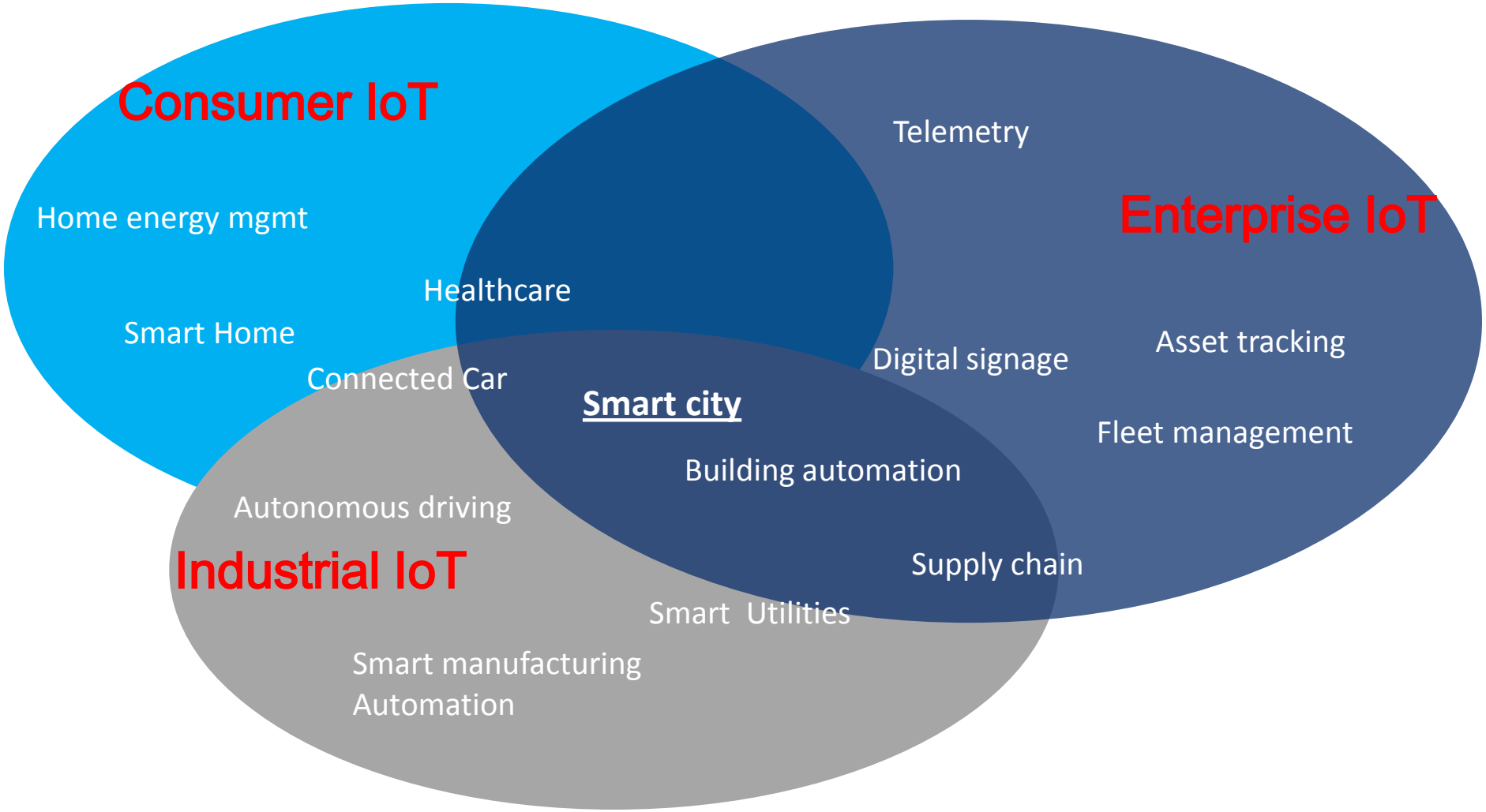


Nearly 40% of economic impact requires interoperability between IoT systems



Source: McKinsey

… in particular true for Smart Cities



Summary of Release 2/3 Features

Industrial Domain Enablement

- Time series data management
- Atomic Transactions
- Action Triggering
- Optimized Group Operations

Home Domain Enablement

- Home Appliance Information Models & SDT
- Mapping to existing standards (OCF, ECHONET, GoTAPI...)

Smart City & Automotive Enablement

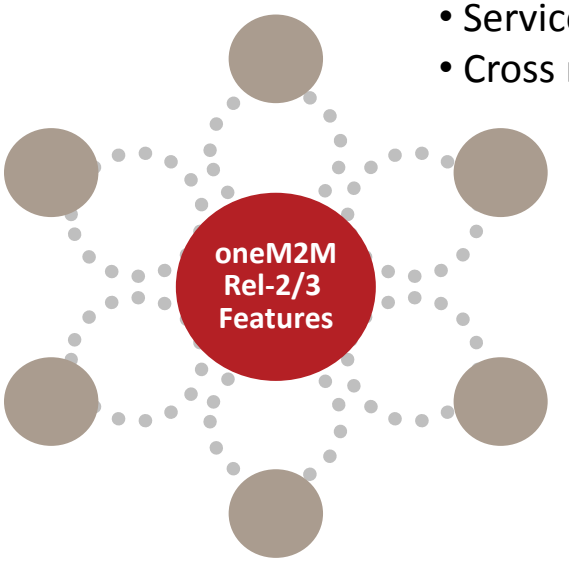
- Service Continuity
- Cross resource subscriptions

Management

- M2M Application & Field Domain Component Configuration

Semantics

- Semantic Description/Annotation
- Semantic Querying
- Semantic Mashups
- oneM2M Base Ontology



Market Adoption

- Developer Guides
- oneM2M Conformance Test
- Feature Catalogues
- Product Profiles

Security

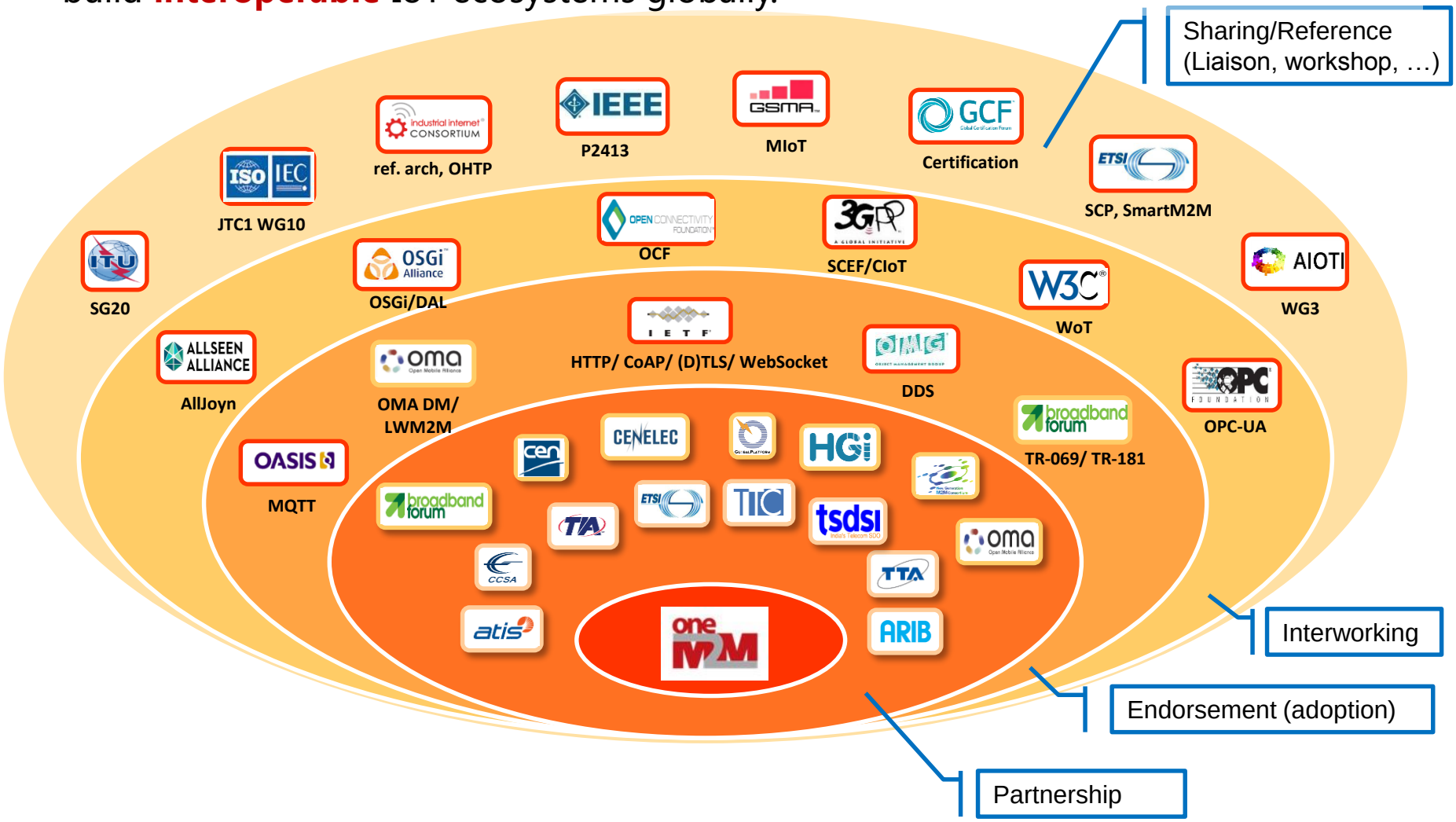
- Dynamic Authorization
- End to End Security
- Enrollment & Authentication APIs
- Distributed Authorization
- Decentralized Authentication
- Interoperable Privacy Profiles
- Secure Environment Abstraction

oneM2M as generic interworking framework

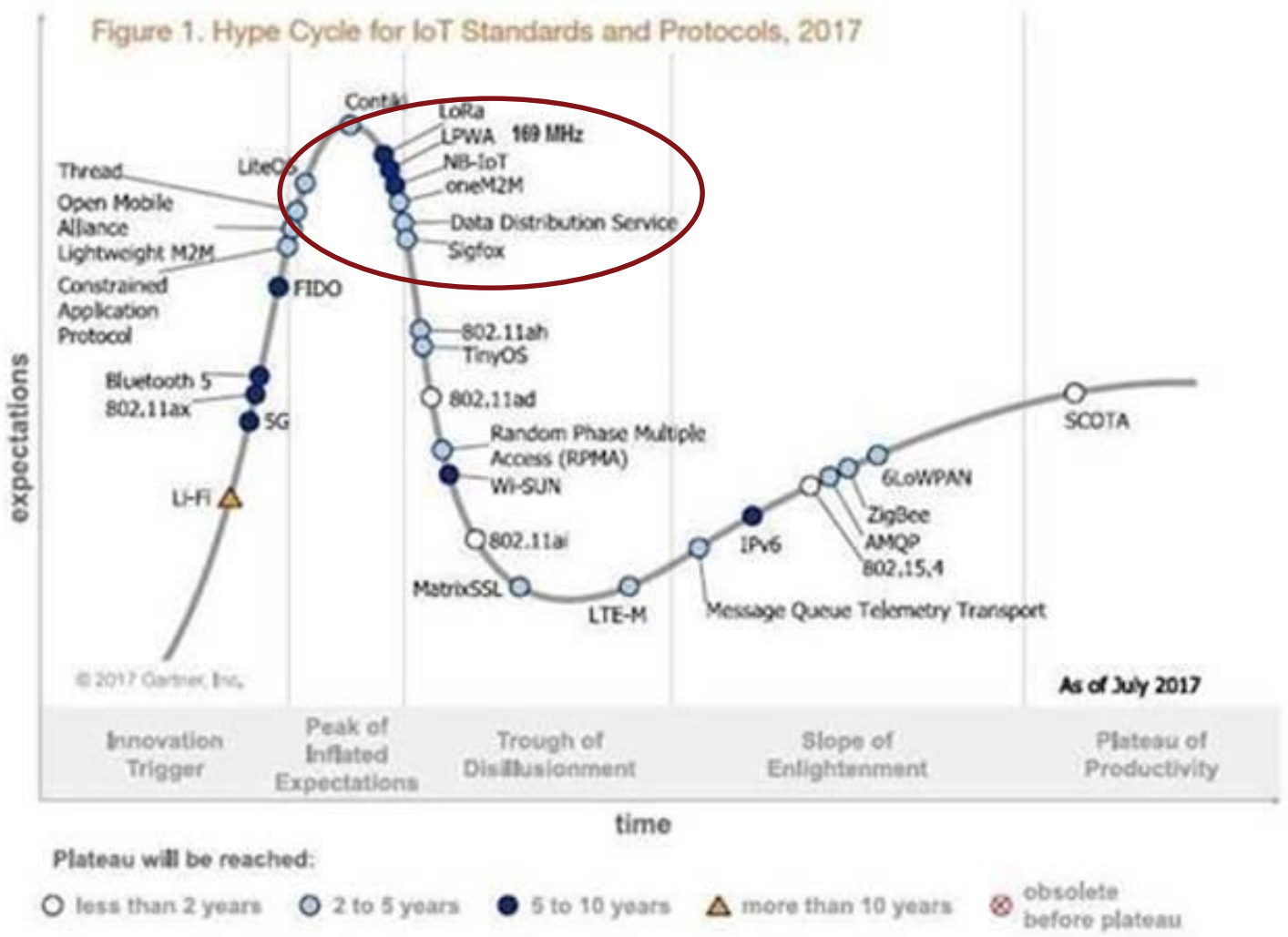
- 3GPP SCEF
- OMA LWM2M
- DDS
- OPC-UA
- Modbus
- AllJoyn/OCF
- OSGi
- W3C WoT

Nobody can do it alone

- Collaboration is important to reach common understanding, avoid overlap and build **interoperable** IoT ecosystems globally.



How well we do? Source Gartner

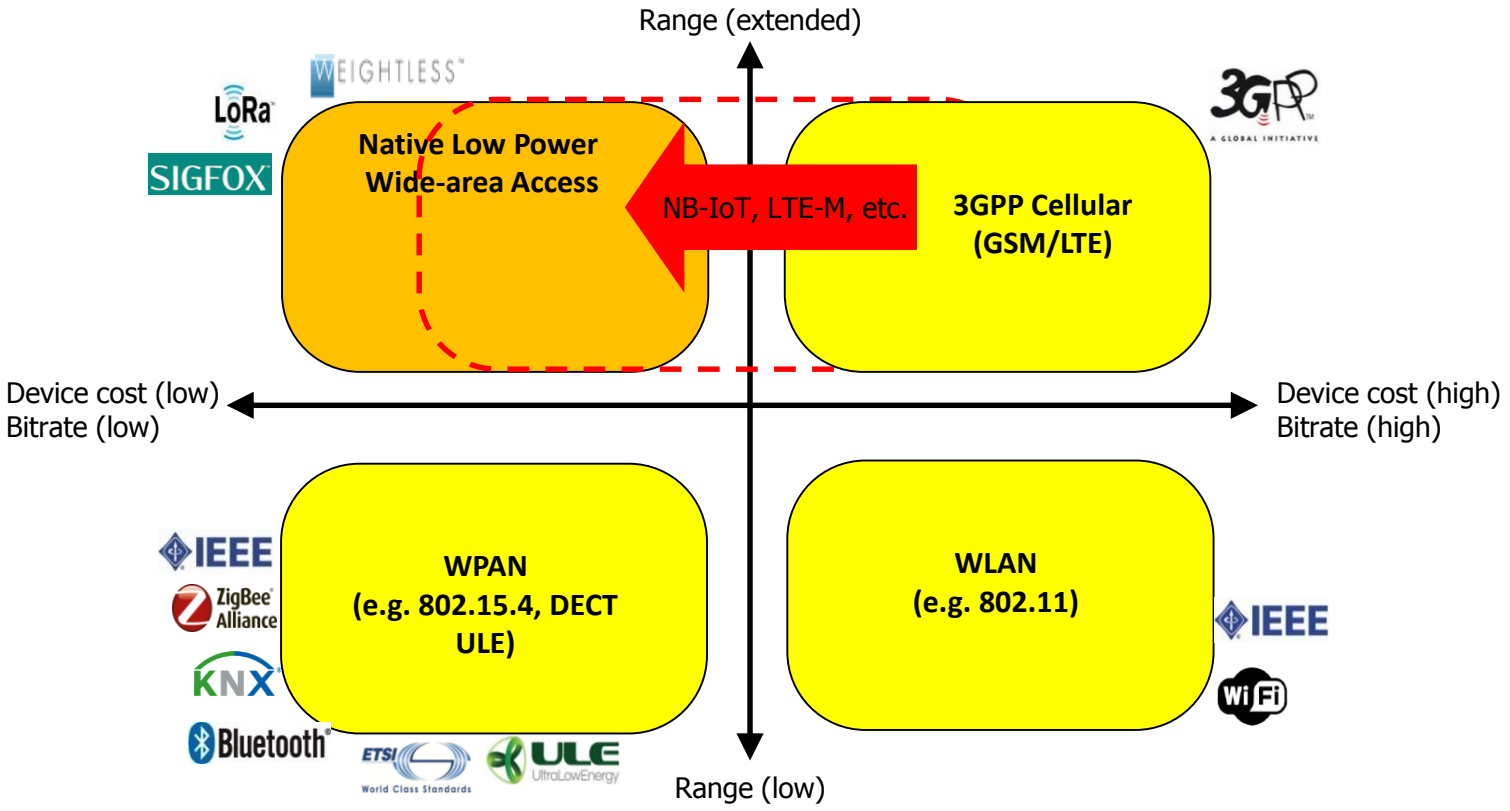


WHY ONEM2M?
WHY NOW?

Why oneM2M? Why now?

- M2M (and IoT) communications existed for so many years, e.g.:
  - SCADA systems
  - Satellite based truck tracking
- So why oneM2M?
  - *Specific standards exist* for home automation, smart factory, energy management, etc. but much larger growth will come from a fully integrated Internet of Things
  - The IoT vision will not materialize if we do not solve interoperability issues, therefore drive down integration costs and ensure time to market
- Why now?
  - Technology is ready for an *outcome based economy* for a large number of use cases, more than what one can think of

Technology 1: connectivity, plenty to chose from

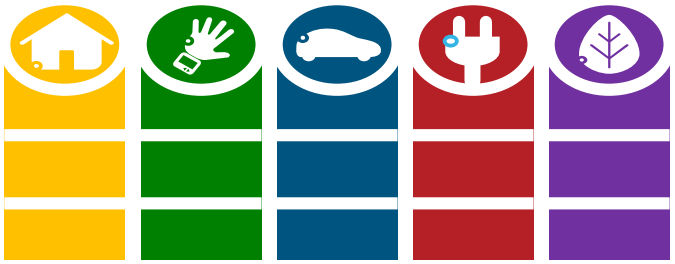


Source AIOTI, modified from an ALU contribution

Technology 2: horizontalization
«building IoT in Siloes belongs to the past »

NICHE VERTICALS
Low volumes, high ARPC, high TCO

- Devices and Applications are designed as “stove-pipes”
- Devices dedicated for single application use
- Solutions are closed and not scalable: duplication of dedicated infrastructure
- High development & delivery cost

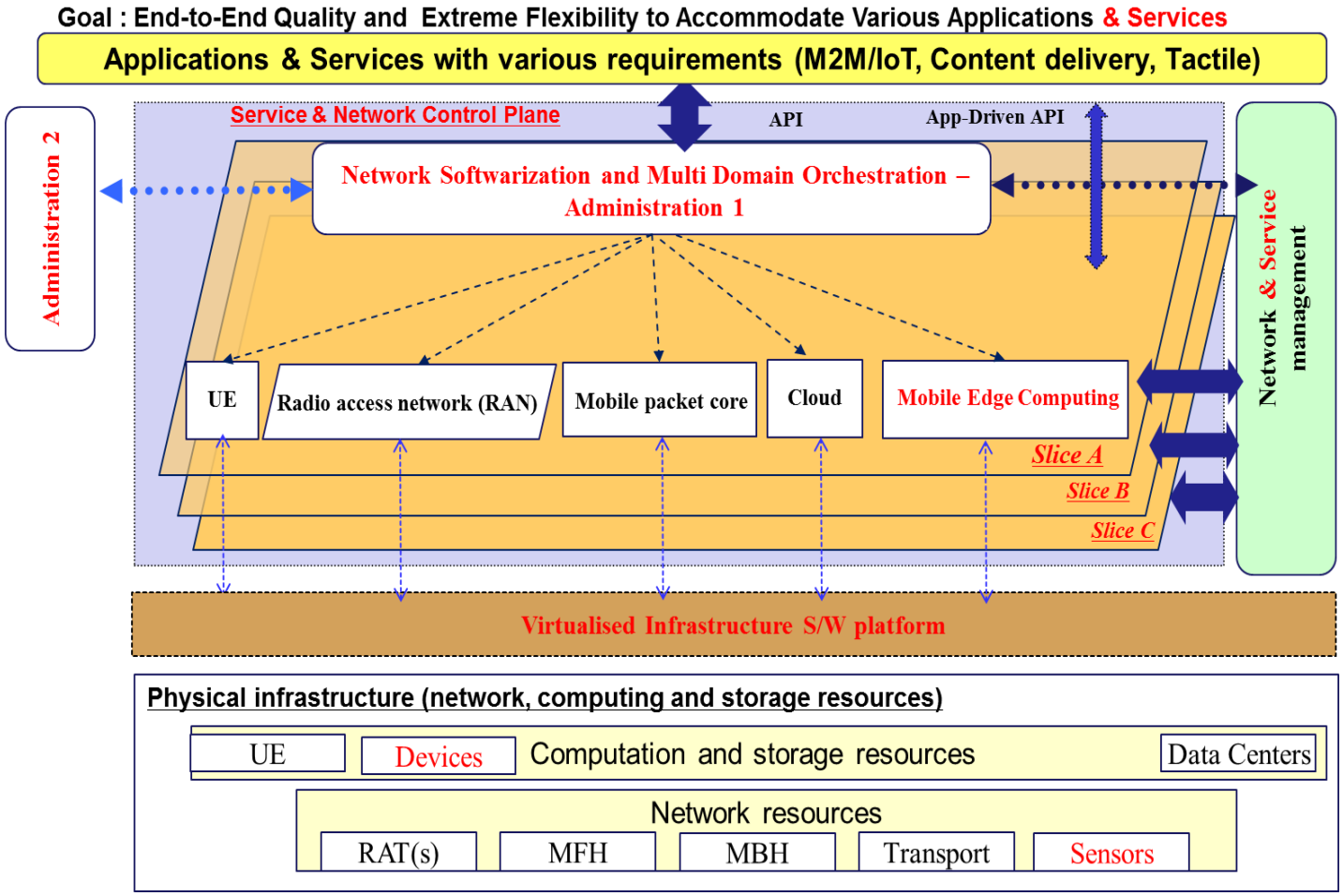


BROAD ADOPTION
High volume, low ARPC, low TCO

- Devices and Applications are designed to collaborate across “clouds”
- Devices are used for multiple application purposes
- Devices and Applications offering continuously evolve
- Easy app development and device integra-tion through APIs and standard interfaces

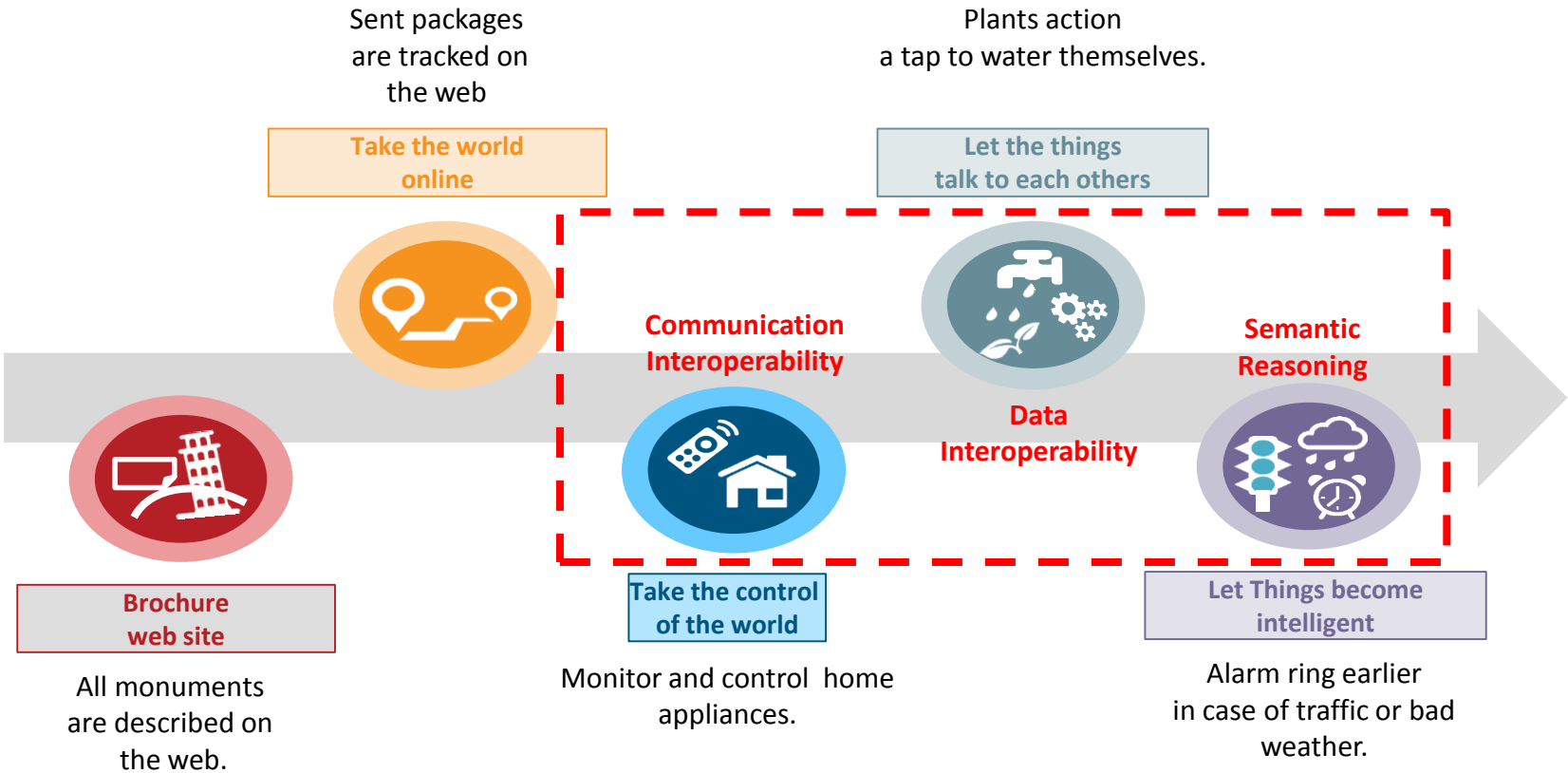
Source: Alcatel-Lucent

Technology 3: "softwarization" and IoT virtualization



Source: ITU-T Focus Group IMT2020

Technology 4: Semantic interoperability, no longer a research syndrome?



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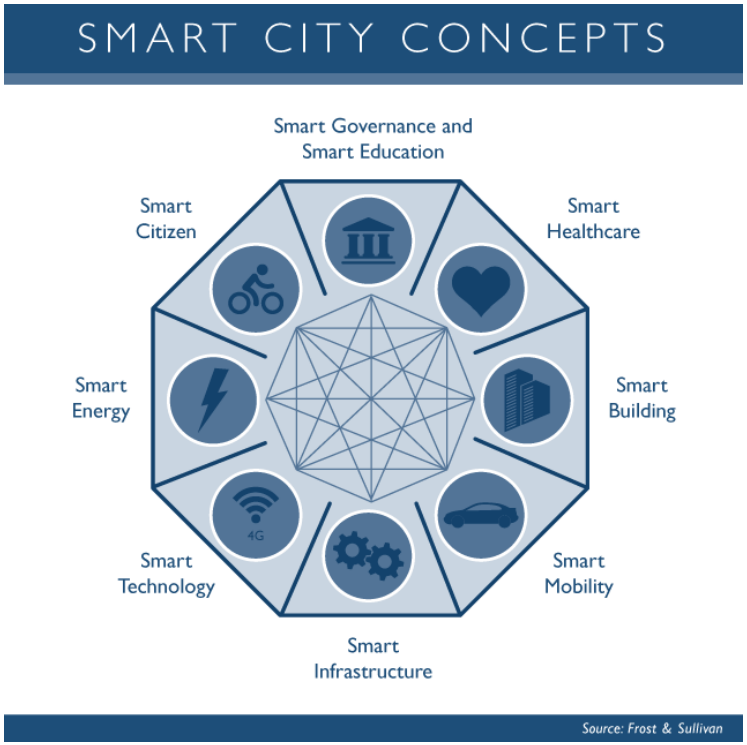
Source: sensinov

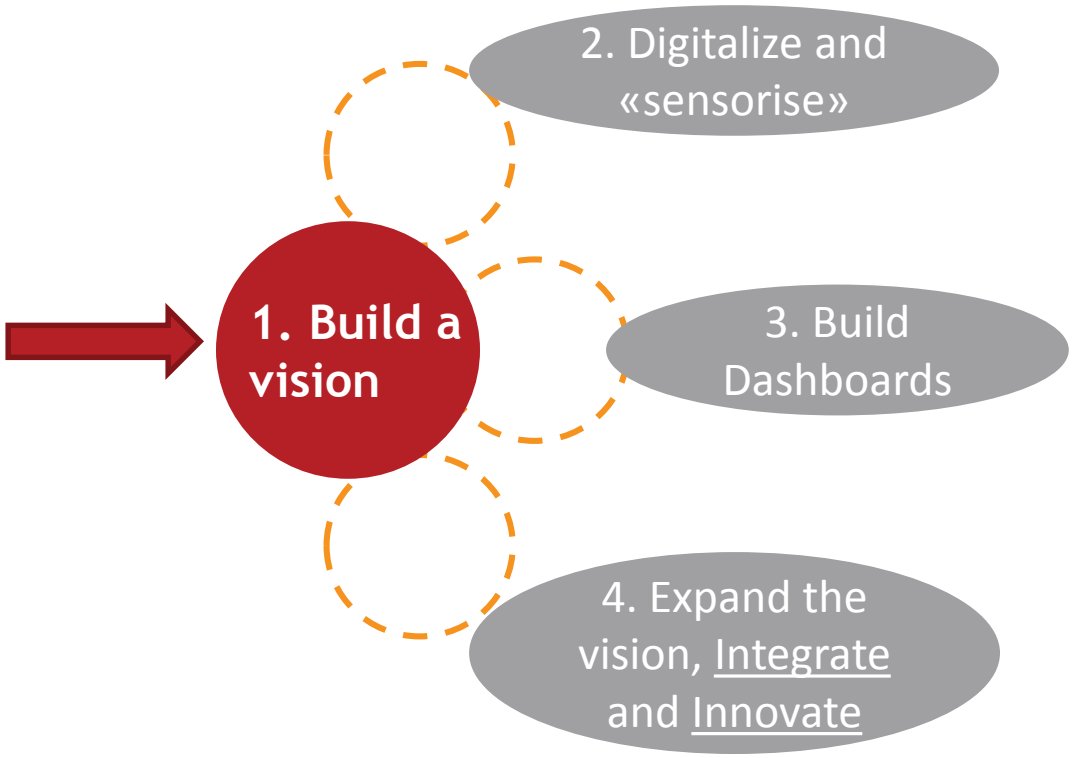
EXAMPLE : ROLE OF ONEM2M IN SMART CITIES

Key findings/trends «City 2.0»

- Smart city platforms bring significant efficiencies when the number of applications grows
  - Shared data
  - Single API set and data formats are beneficial for developers
- Initial cost of platform investment tends to be marginal compared to economies of scale, OPEX options can alleviate initial costs
- Connectivity, plenty to chose from
- Machine learning and analytics create great benefits (e.g. traffic management, parking management)
- Living labs for research and innovation
- Open standards are crucial for sustainable success

Vision for building smart cities





Source: Based on discussions with Dr. Martin Serrano, OASC and Insight centre

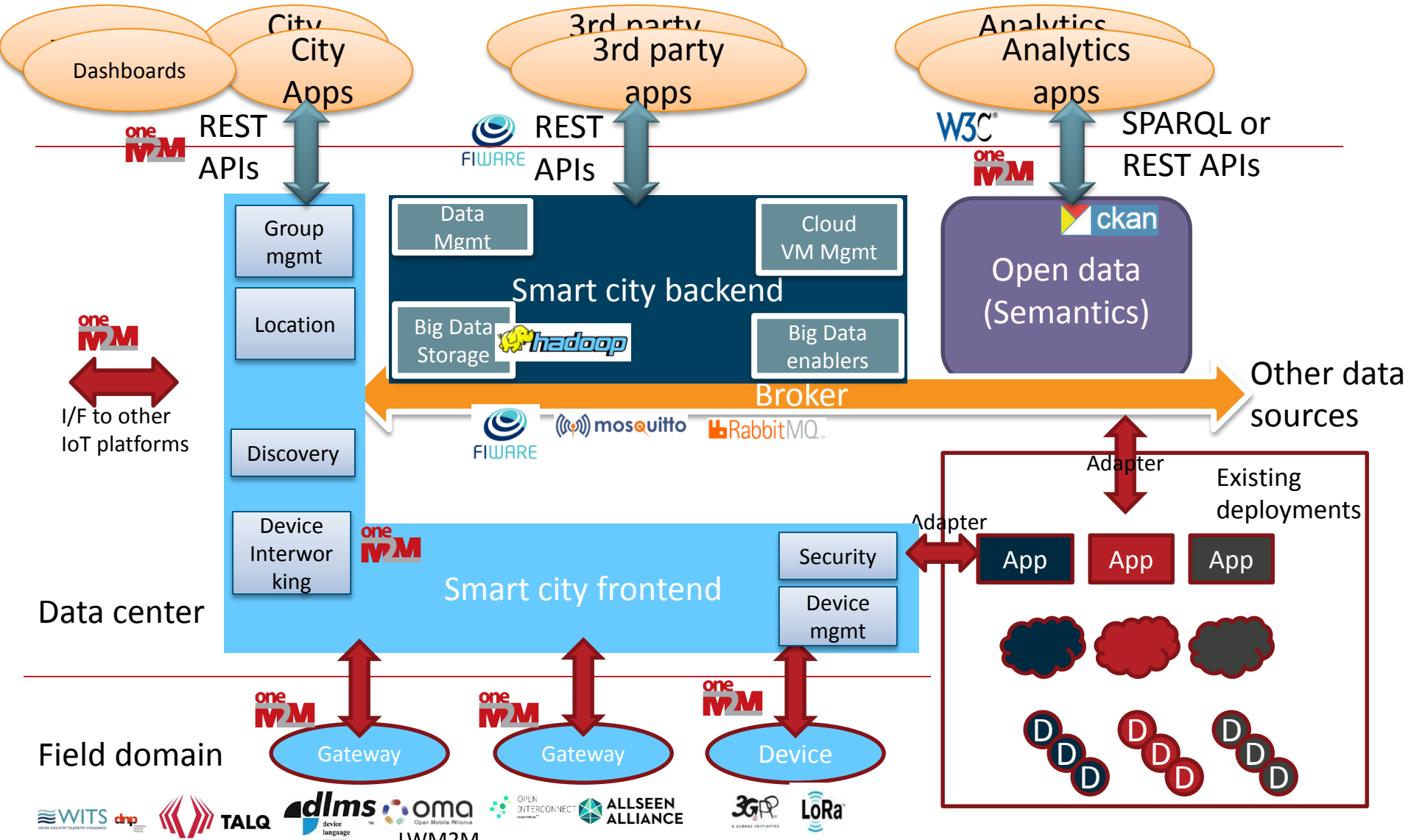
Key requirements for smart city IoT platform

Horizontal platform for new deployments	• Smart city is an **incremental and participatory** journey • New deployments should, where possible, **leverage a converged networks and an horizontal service platform** • **Open standards** are key to avoid lock-in and master the total cost of ownership
Existing deployments	• **Do not disrupt** existing "vertical deployment" but seek opportunities for an integration path with an horizontal approach • **Build value** through mash-ups and open data

Participatory and innovative approach	• Surveys
	• Address **needs for innovation** through app development:
	  • **APIs**
	  • **Access to, eventually semantically enriched, Open data** (where feasible and subject to privacy legislation/citizen consent)

Security and (device) management are key	• Despite initial focus on IoT data, there is an increased interest in security and device management (which go hand in hand). • Need arises from security threat analysis conducted recently: e.g. **"Two researchers analyzed smart meters widely used in Spain and discovered that those can be hacked by attackers to harm the overall National power network.",** source: http://securityaffairs.co/wordpress/29353/security/smart-meters-hacking.html

A possible smart city blue-print



Take-away

Combat fragmentation	• Healthy eco-system with economies of scale • More partnering choices and opportunities for M2M/IOT industry stakeholders
Lower CAPEX	• Standardized protocols / APIs -> simplifies application development/deployment • Cross-vertical standards -> same devices and back-ends in different industries
Lower OPEX	• Standard features to use networks more efficiently -> get better tariffs • Flexibility for verticals -> utilize best transport network meeting business needs
Time to Market	Reduced development, test and deployment lifecycles through focusing on core business (application logic)