1 - IoT, Vision and Challenges

Dr. Mahdi Ben Alaya
Founder & CEO, Sensinov

benalaya@sensinov.com
www.sensinov.com

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Biography

- R&D engineer at LAAS-CNRS laboratory in Toulouse, France.
- Ph.D in IoT system interoperability
- Founder and CEO of Sensinov startup.
- Vice Chairman of oneM2M Testing Group.
- Co-founder and technical manager of the open source project Eclipse OM2M.

- IoT tutorials in summer schools and universities worldwide including France, Taiwan, and Korea.
- R&D projects at LAAS-CNRS and Sensinov including ITEA2-USENET, ITEA2-A2NETS, H2020-LSP5-AUTOPILOT, ETSI-OSM, and ETSI-SAREF.
- Authored more than 20 refereed publications in international journals and conferences.
- More than 50 contributions to IoT standards.

IoT Solutions

Open Source

Research

Standards
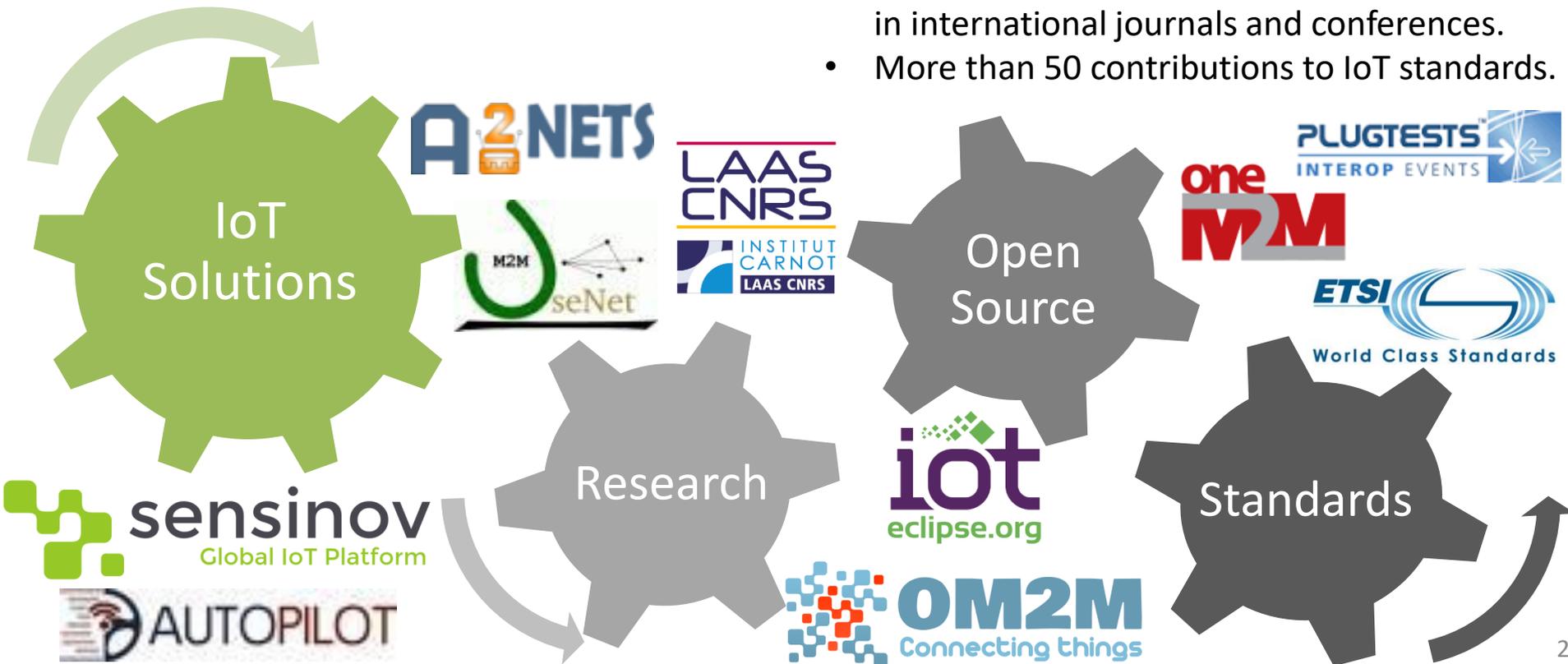
The evolution of IoT

Sent packages are tracked on the web

Plants action a tap to water themselves.

Take the world online

Let the things talk to each others

Communication Interoperability

Semantic Reasoning

Data Interoperability

Brochure web site

Take the control of the world

Let Things become intelligent
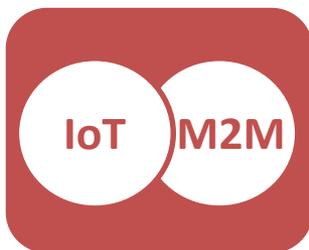
All monuments are described on the web.

Monitor and control home appliances.

Alarm ring earlier in case of traffic or bad weather.
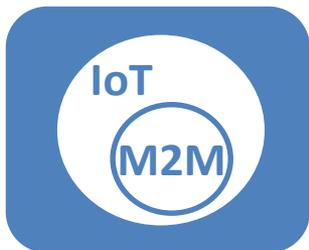
IoT vs M2M

M2M paradigm

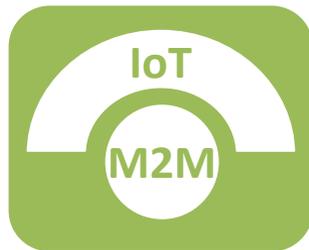The ability of machines to communicate with other devices without human interventions.

M2M as an industrial environment

- M2M: based on industrial protocols, closed solutions.
- IoT: common usage applications, open solutions for mass.

M2M as a subset of IoT

- M2M: connects devices, electronic sensors, RFID tags.
- IoT: connects general things, animals, peoples.

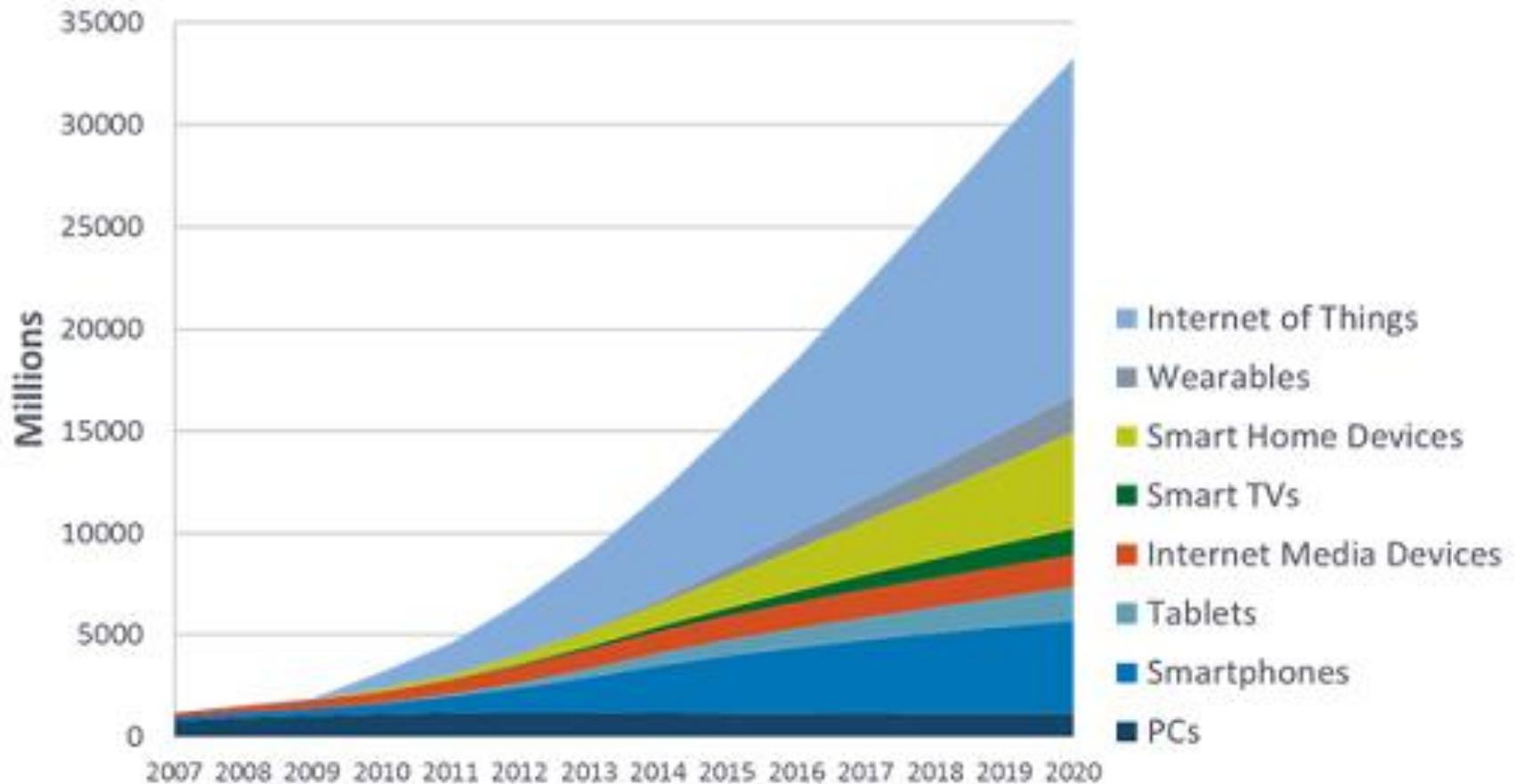### M2M as the kernel of IoT

- M2M: plumbing of IoT, required connectivity for things.
- IoT: depends on M2M, not possible without it.

Adopted definition

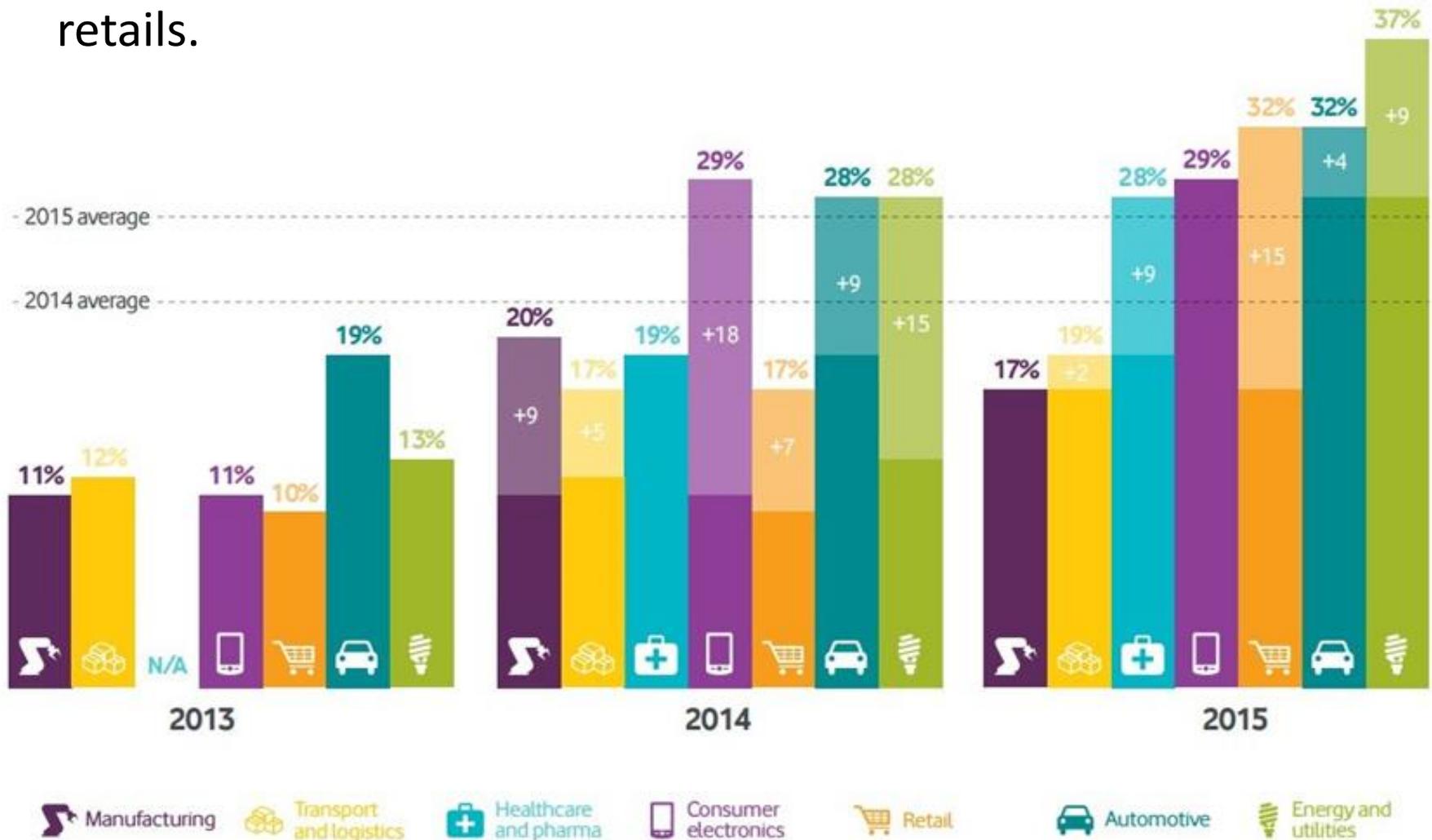# Global Internet device installed Base Forecast

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- 33 Billion Internet Devices By 2020: Four Connected Devices For Every Person In World.
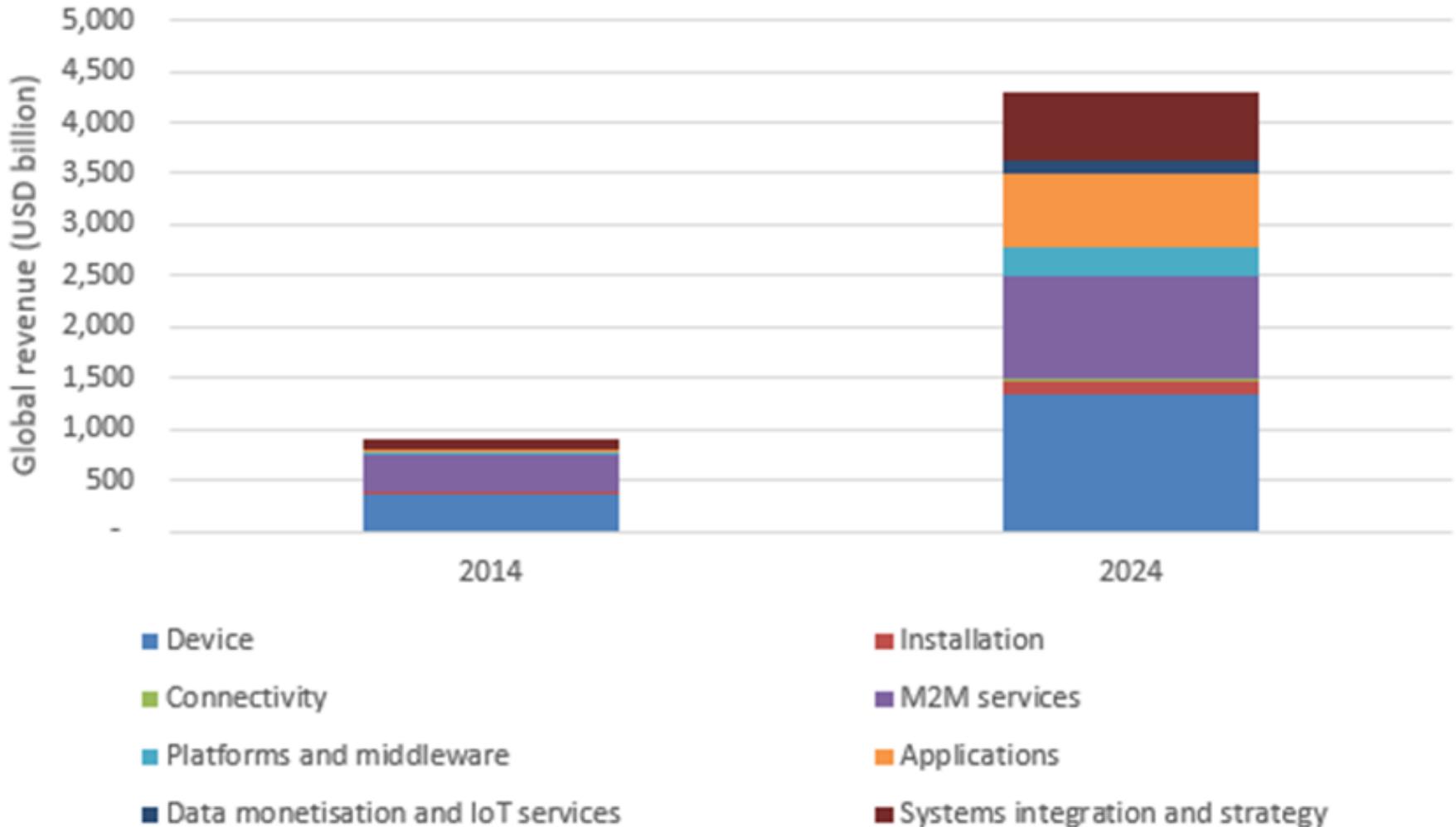

Source: Strategy Analytics, October 2014

Adoption of IoT by industry

- Energy and utilities leading closely followed by automotive and retails.

Source: The M2M adoption Barometer 2014, Vodafone

Global IoT Market opportunities

- IoT market opportunity will be reach 4.3 trillion USD by 2024.

Legend:
- Device
- Connectivity
- Platforms and middleware
- Data monetisation and IoT services
- Installation
- M2M services
- Applications
- Systems integration and strategy

Source: Machina Research, 2015

IoT main challenges

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Vertical Fragmentation

vendor-specific solutions, no interoperability, semantic gap.

Power Management

Inefficient battery life-cycles, lack of clean energy.

IoT

Increasing Complexity

Large number of devices, Unmanageable, high costs

Security

Weakness in M2M devices, privacy, fraud, cyber attacks.

Network Misalignment

Devices behavior differs from humans: collapse of internet infra.

*M2M Communications A Systems Approach - 2012 (book)

Thank you for your Attention

benalaya@sensinov.com
www.sensinov.com