



IPv6 for Smart Objects and its Applications

Dr Lim Joo Ghee

Singapore Polytechnic

IPv6 Conference

31 July 2012

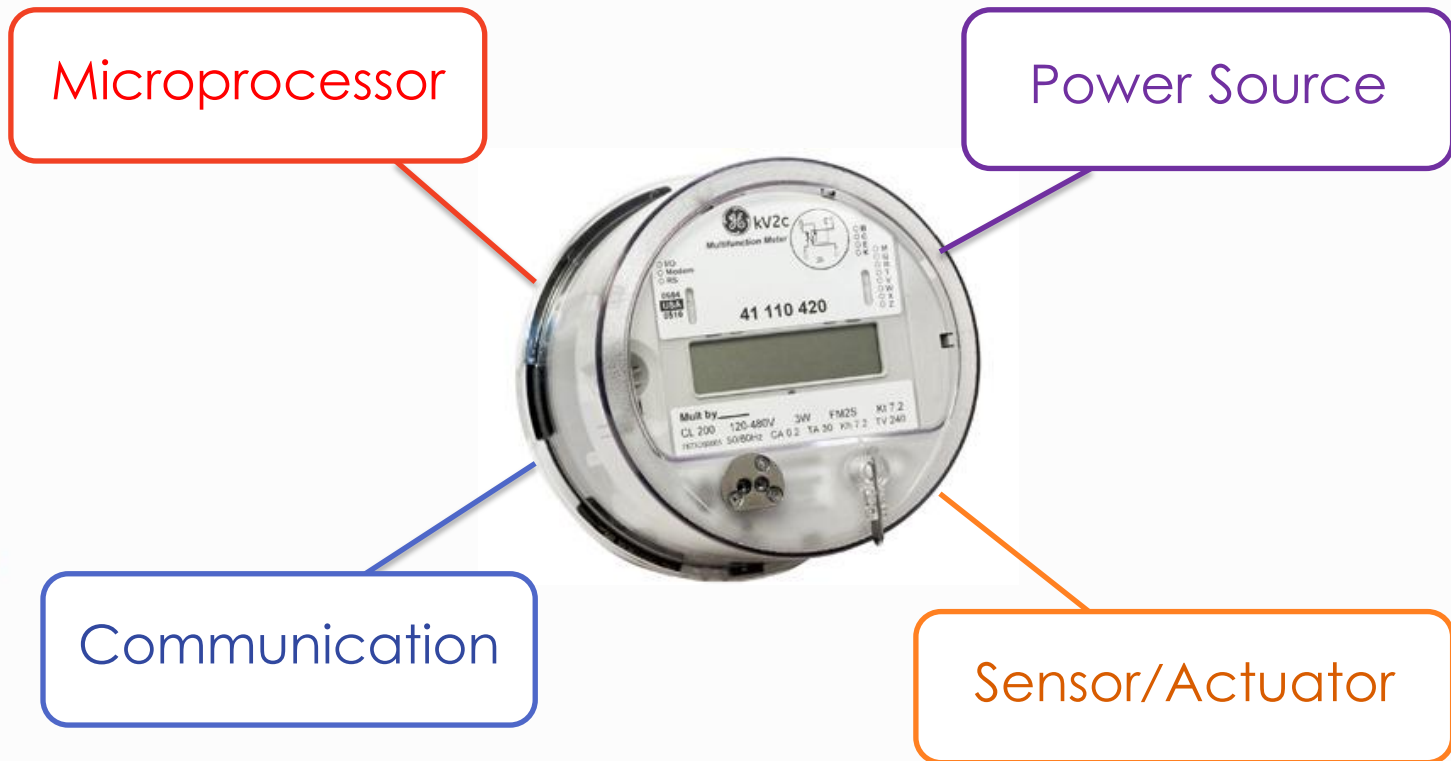


Agenda

- What is a smart object?
- Why IPv6 for smart objects?
- Standardization Efforts
- Applications and Markets

What is a smart object?

- A device with the following capabilities:



Some examples of smart objects



Energy Meter



Temperature Sensor



Light Bulb



Toy

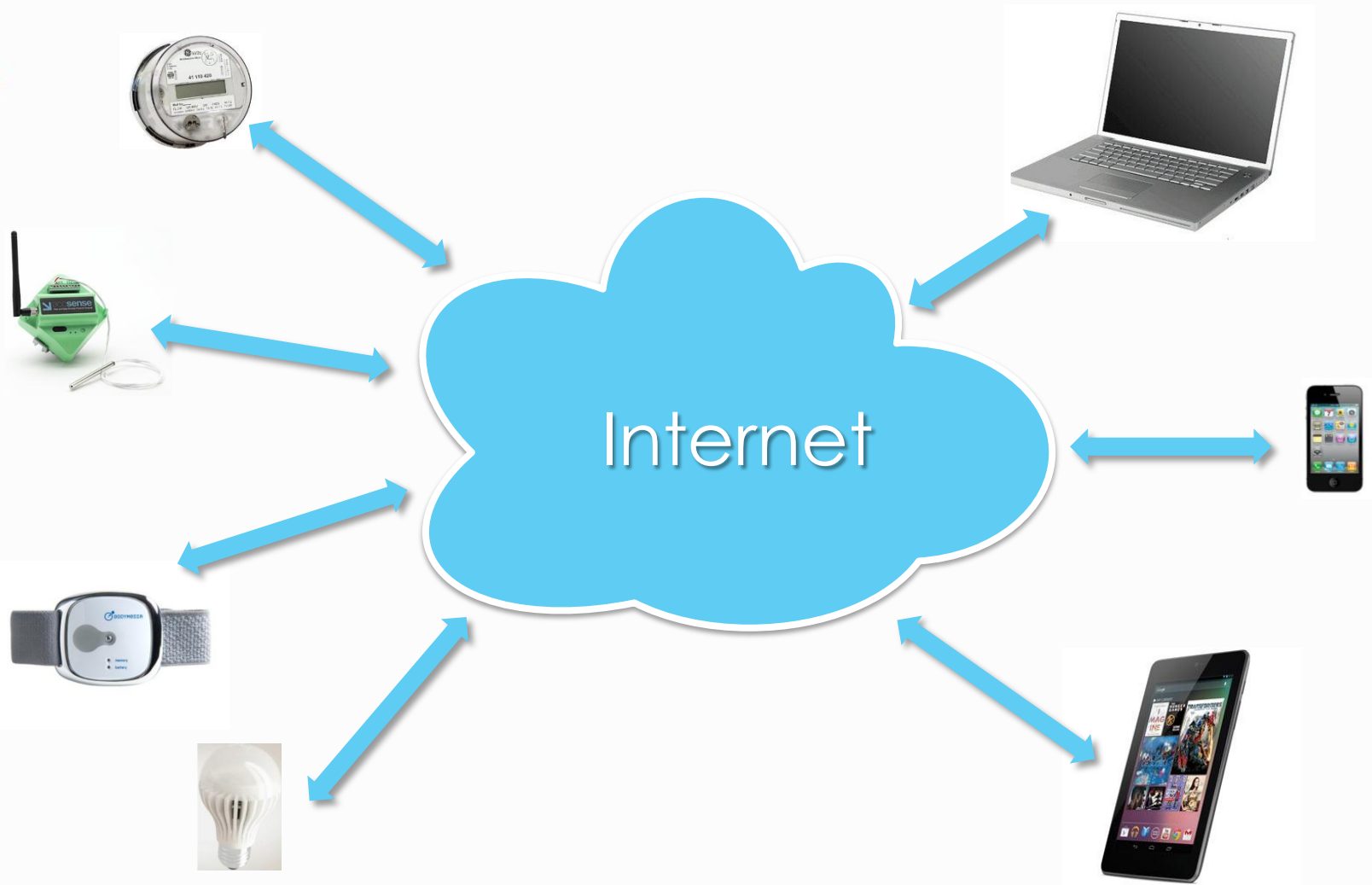


Body Sensor



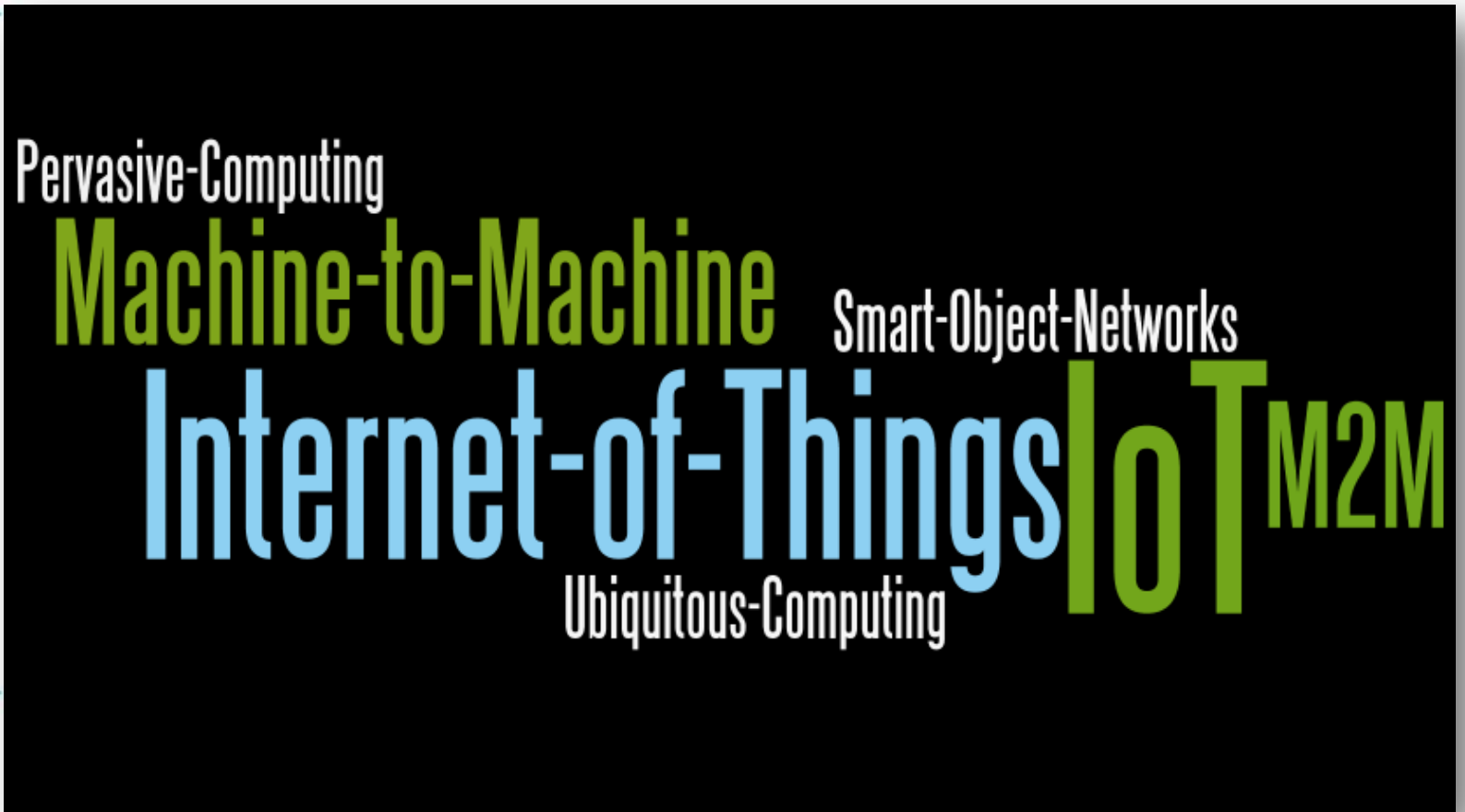
Thermostat

Network of smart objects

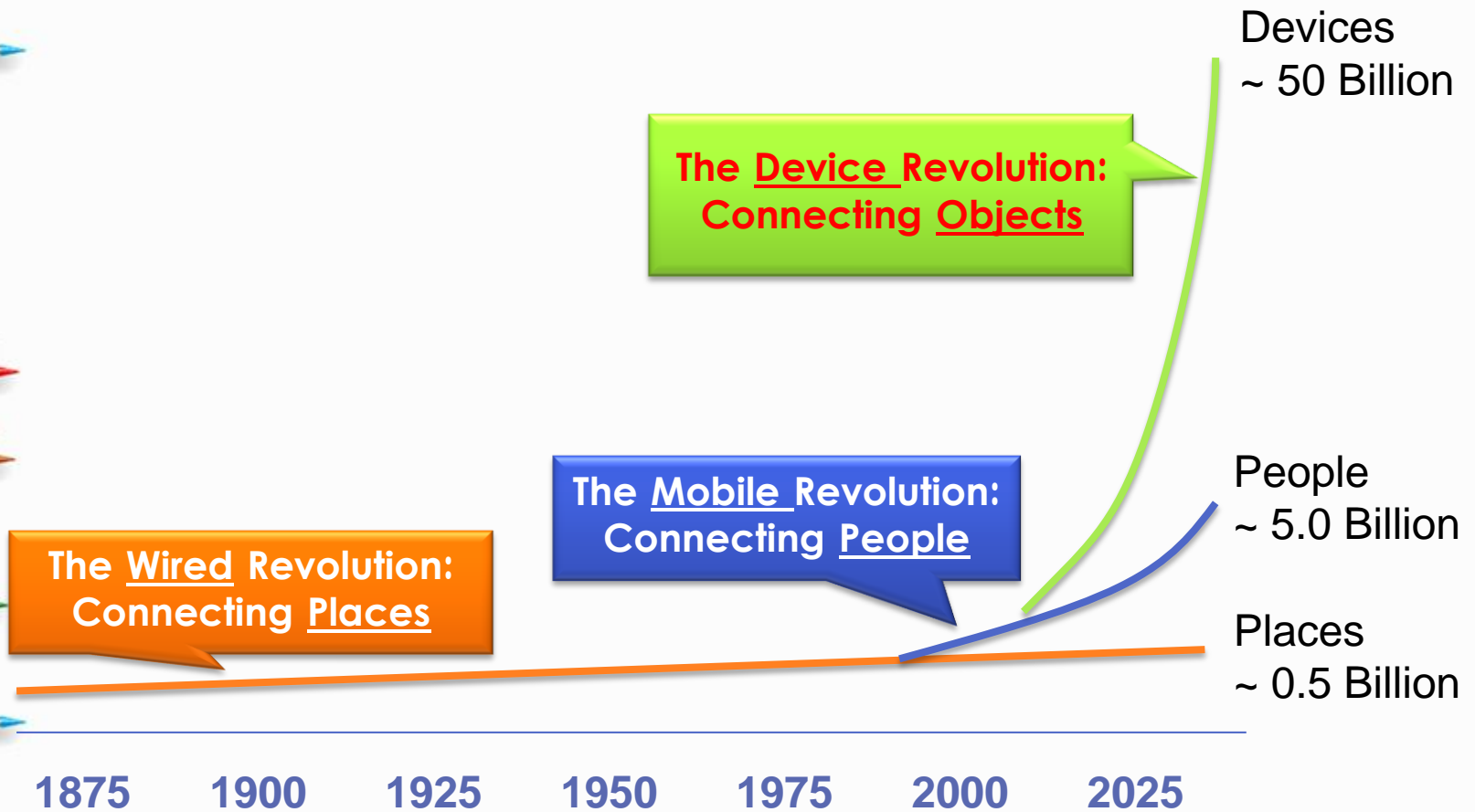




Network of smart objects

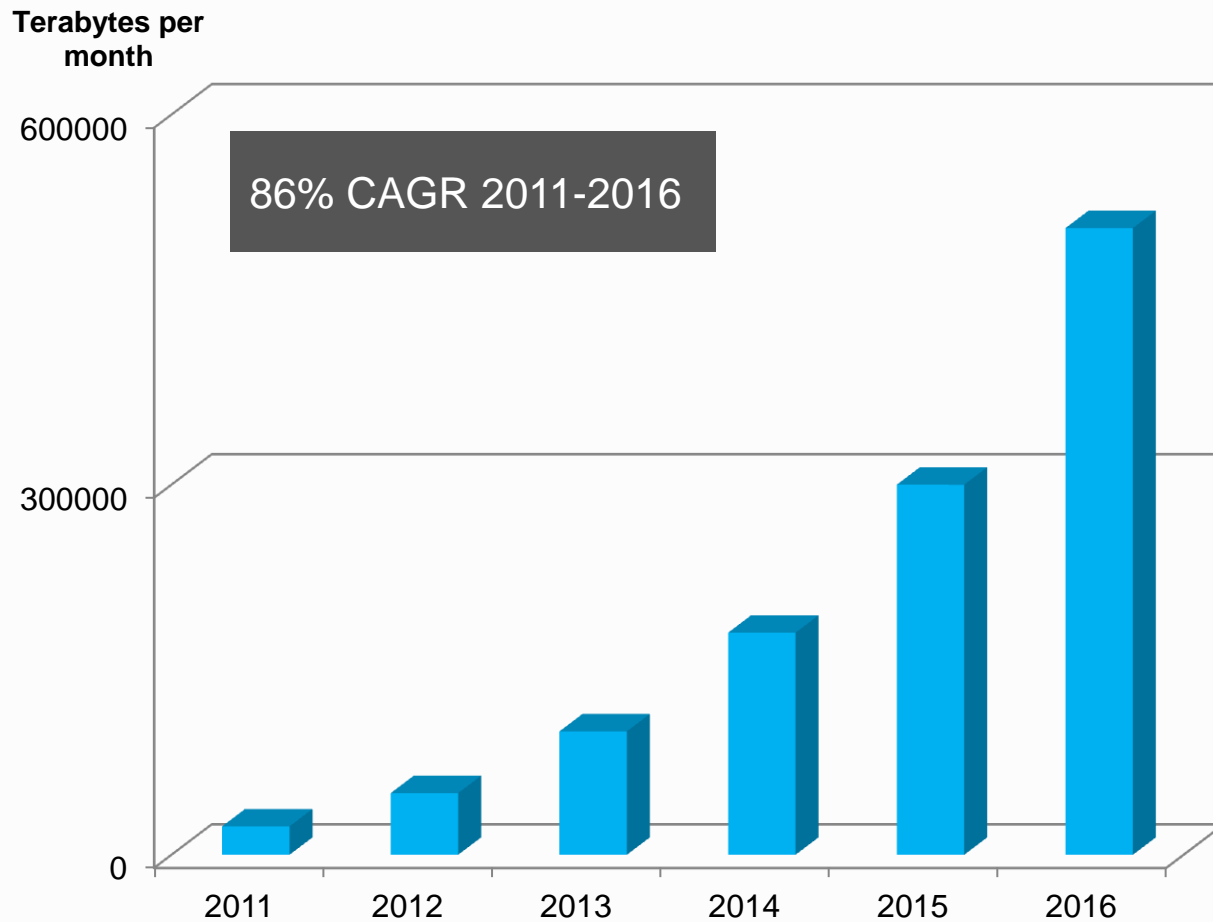


Growth Potential



Source: Ericsson

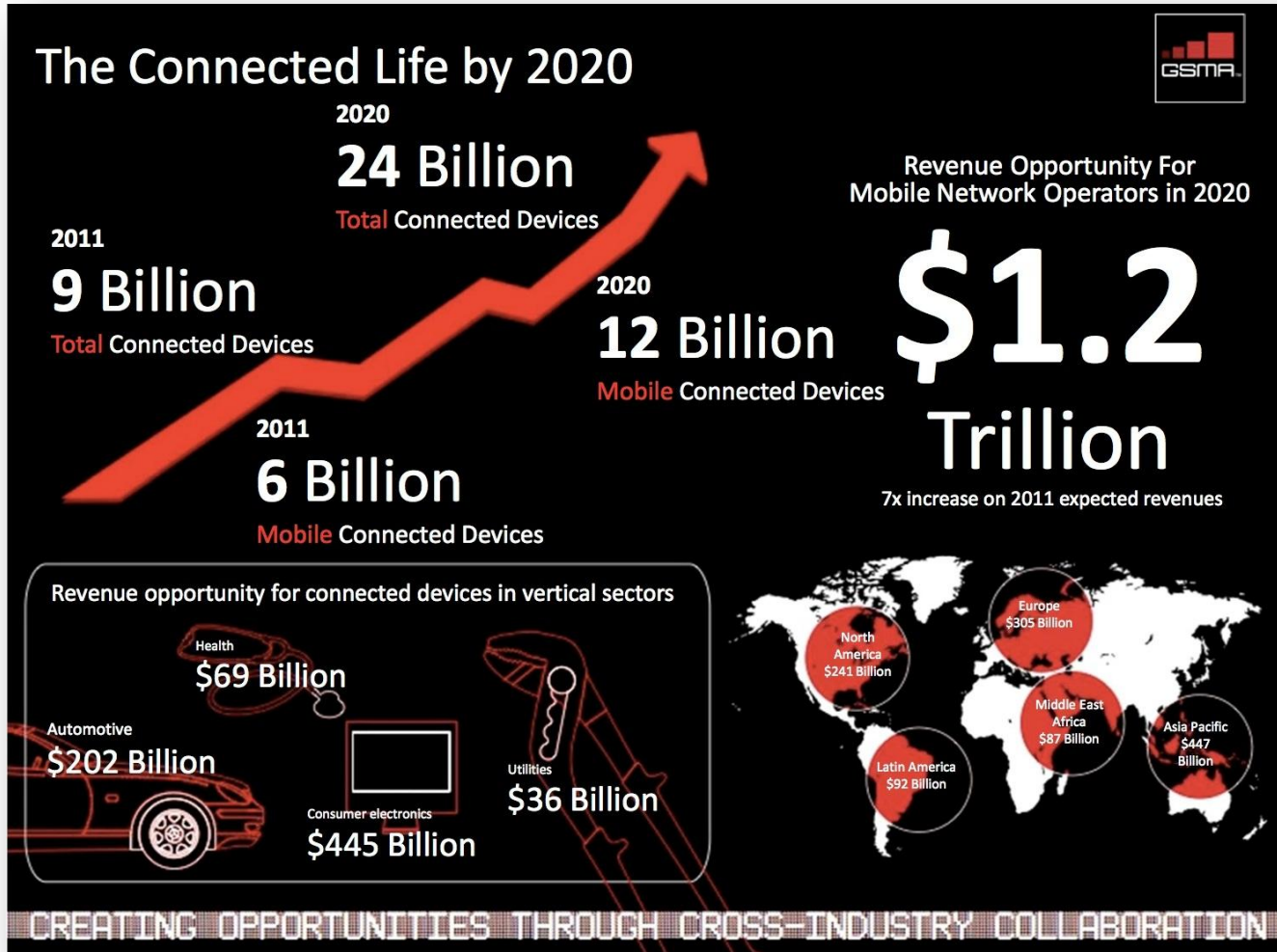
Growth Potential



M2M traffic to increase **22-fold** from 2011 to 2016

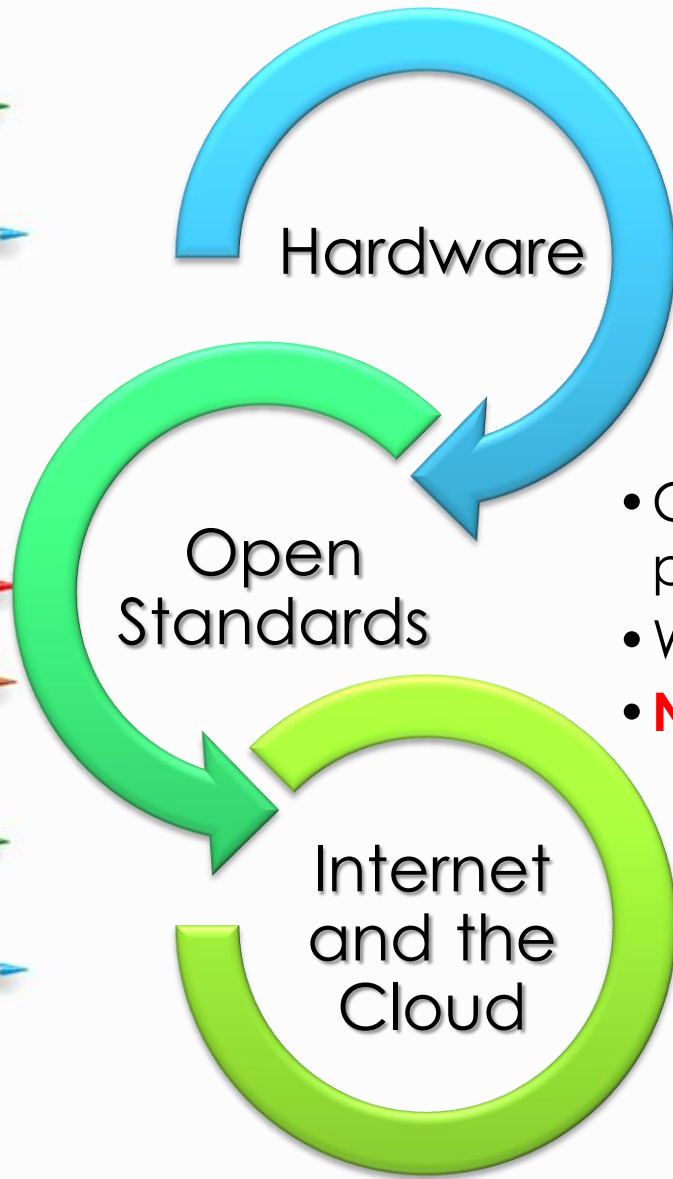
Source: Cisco

Growth Potential



Source: GSMA

Key Enablers



- Smaller
- Cheaper
- More powerful
- Lower energy consumption

- Communication protocols
- Web services
- **Networking**





Why IPv6 for Smart Objects

- Interoperability
- Adaptability
- Stability
- Network configuration and management

- End-to-End
- Security
- Large address space

Standardization Efforts

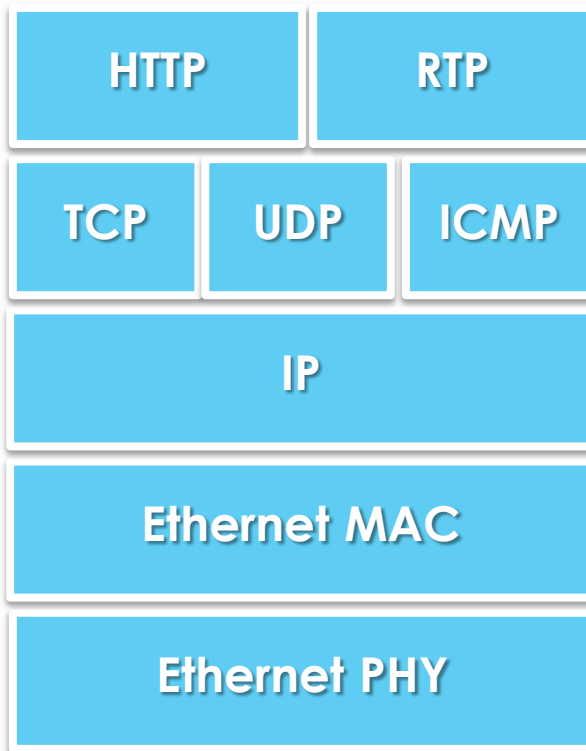


I E T F[®]

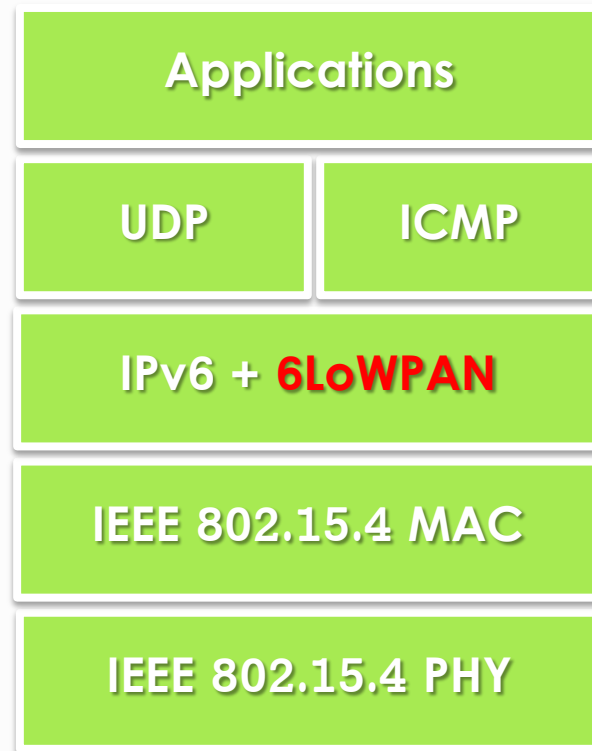
- IPv6 over Low power WPAN (6LoWPAN)
- Routing Over Low power and Lossy networks (ROLL)
- Constrained RESTful Environments (CORE)

6LoWPAN Protocol Stack

IP Protocol Stack



6LoWPAN Protocol Stack

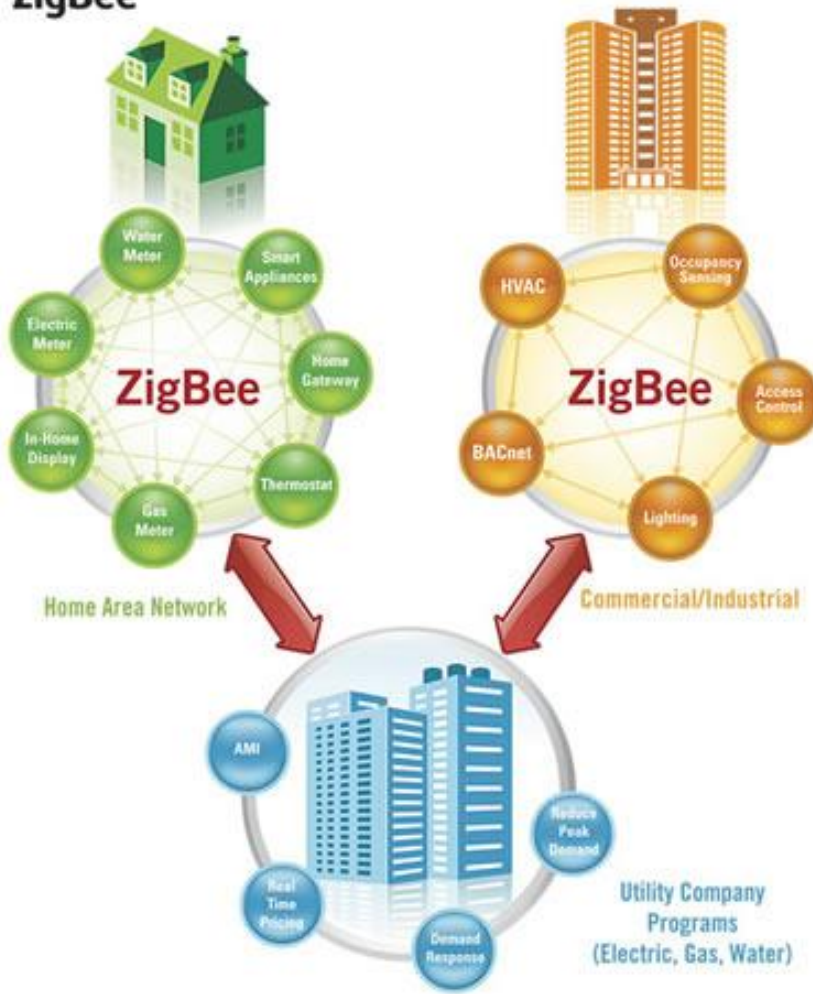


IP for Smart Objects Alliance



ZigBee Smart Energy

ZigBee®



Zigbee Smart Energy 2.0 Profile to define an IPv6-based protocol

Source: Zigbee Alliance



Applications/Markets

"... many appliances around the house, in the office, in the car, on our persons, in the buildings that we work and live in will be instrumented and will be part of the net... When those appliances are Internet-enabled... you open up an opportunity for new businesses to manage those devices."

Vint Cerf

Vice President and Chief Internet Evangelist

Google Inc.

Markets

- Industrial Monitoring



Markets

- Industrial Monitoring
- Energy



Markets

- Industrial Monitoring
- Energy
- Structural Monitoring



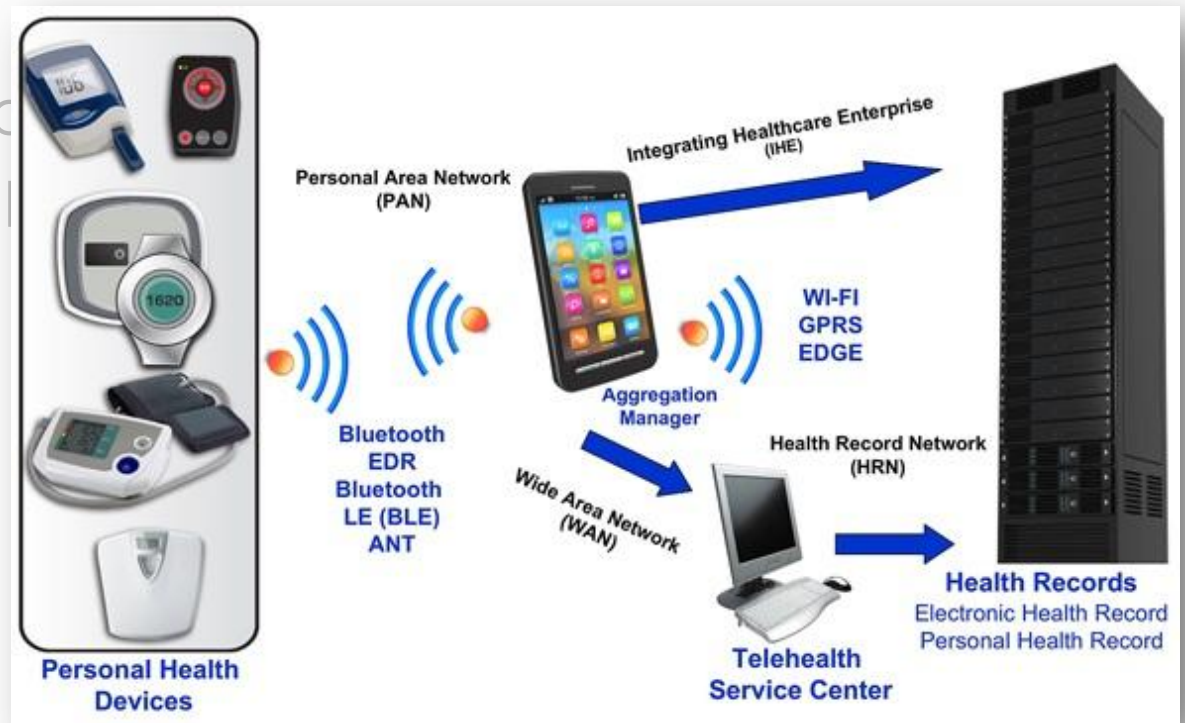
Markets

- Industrial Monitoring
- Energy
- Structural Monitoring
- Connected Home



Markets

- Industrial Monitoring
- Energy
- Structural Monitoring
- Connected Infrastructure
- Healthcare



Markets

- Industrial Monitoring
- Energy
- Structural Monitoring
- Connected Home
- Healthcare
- Vehicle Telematics



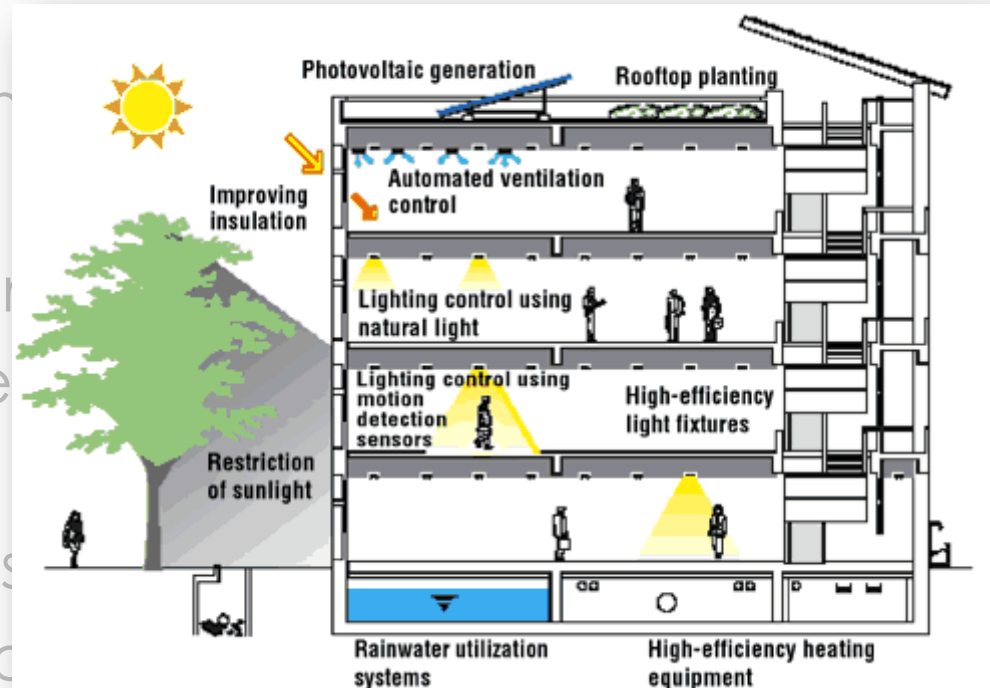
Markets

- Industrial Monitoring
- Energy
- Structural Monitoring
- Connected Home
- Healthcare
- Vehicle Telematics
- Agricultural Monitoring



Markets

- Industrial Monitoring
- Energy
- Structural Monitoring
- Connected Home
- Healthcare
- Vehicle Telematics
- Agricultural Monitoring
- Building Management





Texas Instruments CC-6LoWPAN Development Kit



NXP JenNet-IP Evaluation Kit



Belkin WeMo Home Automation System





Life is for sharing.

[Login](#) [Register](#) [Contact us](#)

[Home](#) [Discover M2M](#) [Developers](#) [Our Offers](#) [Industries](#) [Marketplace](#) [References](#) [Partner Portal](#) [News](#) [About Us](#)

[Home](#) > [Marketplace](#)

M2M Marketplace

The simplest way to find the right M2M Solution.

LUCOM GmbH

LTE 4G router LR77 v2

Max. downlink 100 Mb/s, max. uplink 50 Mb/s - adapted for traffic/security camera systems, ATM, etc



795.00 €

Excludes VAT

[Details](#)

1 2 3

My Basket: 0 Articles

Product search

search a term...

[Search](#)

Choose your region/currency

International

Euro

[Submit](#)

Hardware

M2M components such as modems, modules sensors, terminals and processors. Find all relevant M2M hardware products here.



[Details](#)

Software

Discover our evolved M2M software which perfectly applies to your needs.



[Details](#)

Mobile Apps

M2M Apps that will enable you to send and receive relevant data in order to make use of M2M anywhere and anytime.



[Details](#)

Contact

If you have any questions...

[Contact us](#)



Industries

State-of-the-art technology in M2M technology can be found in most industries, this is why we have categorized our products according to nine different industry segments. This enables you to browse only the products suitable for your business. Just click on the picture to the right to see all the industry segments and their descriptions.

Deutsche Telekom marketplace for M2M communication technologies



Login

[Login as registered user](#)

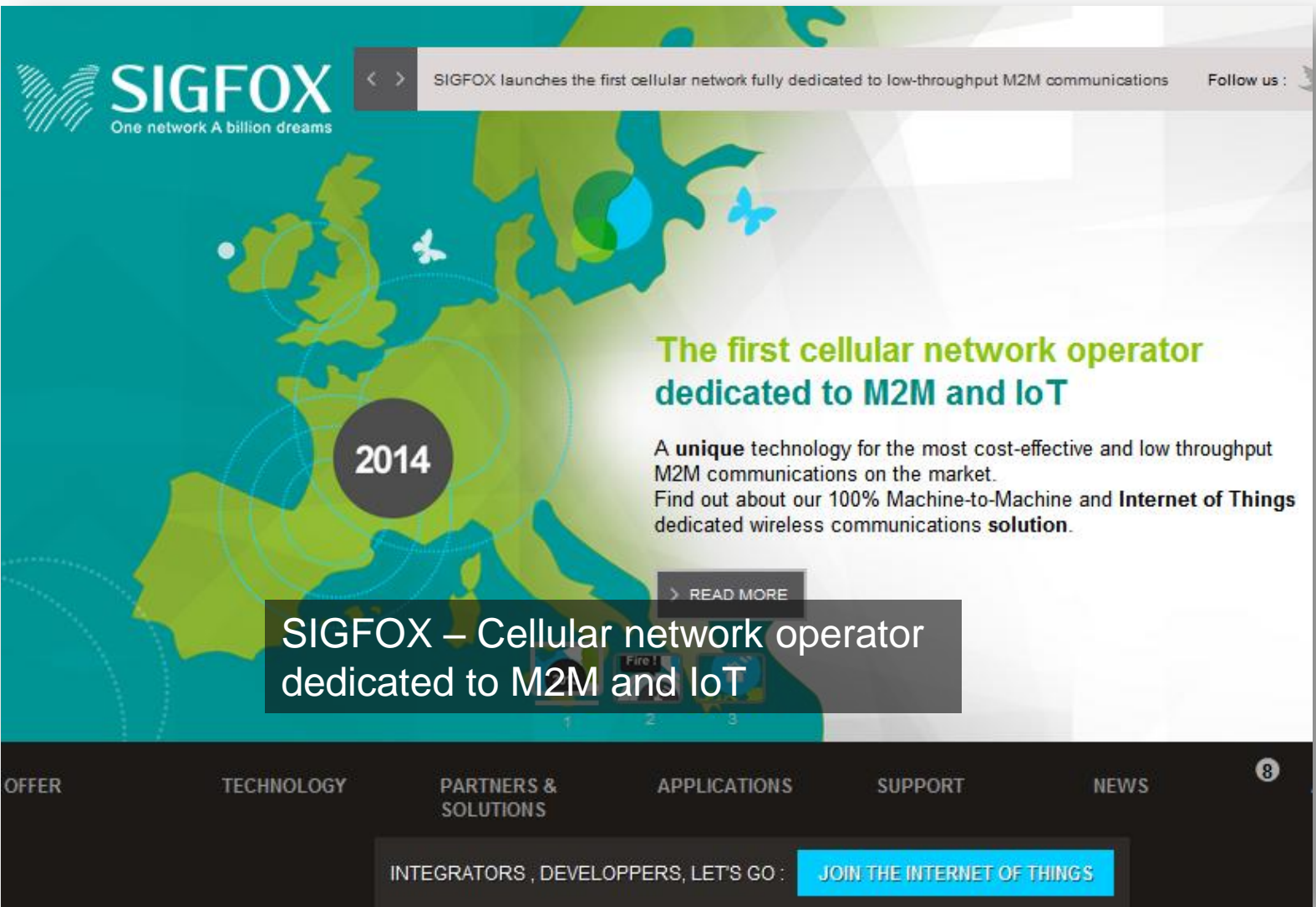

Email

Password

I accept the [terms of use](#)

[Login](#)

[Register as a new user](#)



SIGFOX
One network A billion dreams

SIGFOX launches the first cellular network fully dedicated to low-throughput M2M communications

Follow us :

2014

The first cellular network operator dedicated to M2M and IoT

A **unique** technology for the most cost-effective and low throughput M2M communications on the market.
Find out about our 100% Machine-to-Machine and **Internet of Things** dedicated wireless communications **solution**.

READ MORE

SIGFOX – Cellular network operator dedicated to M2M and IoT

OFFER TECHNOLOGY PARTNERS & SOLUTIONS APPLICATIONS SUPPORT NEWS 8

INTEGRATORS , DEVELOPPERS, LET'S GO : [JOIN THE INTERNET OF THINGS](#)



cosm
Connect to your world

About How it works Support/API Search

Forgot password Login Sign Up
Username Password

Where the Internet of Things is being built.

Connect devices and apps on the Cosm platform, exchange data and ideas with developers, and bring smart products to the world.

How Cosm Works

Get Started

Public cloud resource for smart devices

Umoya Wind Turbines
Jasper Pons

pachube cosm
Cosm is everything you know and love about Pachube, with more power to connect and build the Internet of Things today. [Find out more](#)

Events [View all \(3\)](#)

- Barcelona IoT Meetup
July 23, 2012
- Chicago #AirQualityEgg 'Hackshop'
July 24, 2012
- Internet of Things Meetup 10
July 24, 2012

<https://cosm.com/>



Conclusion

- Tremendous market potential in M2M/IoT/Smart object networks
- Much of these data will need to be uploaded, stored and processed
- IPv6 is an ideal candidate
- Opportunities for new businesses and channels



Thank You