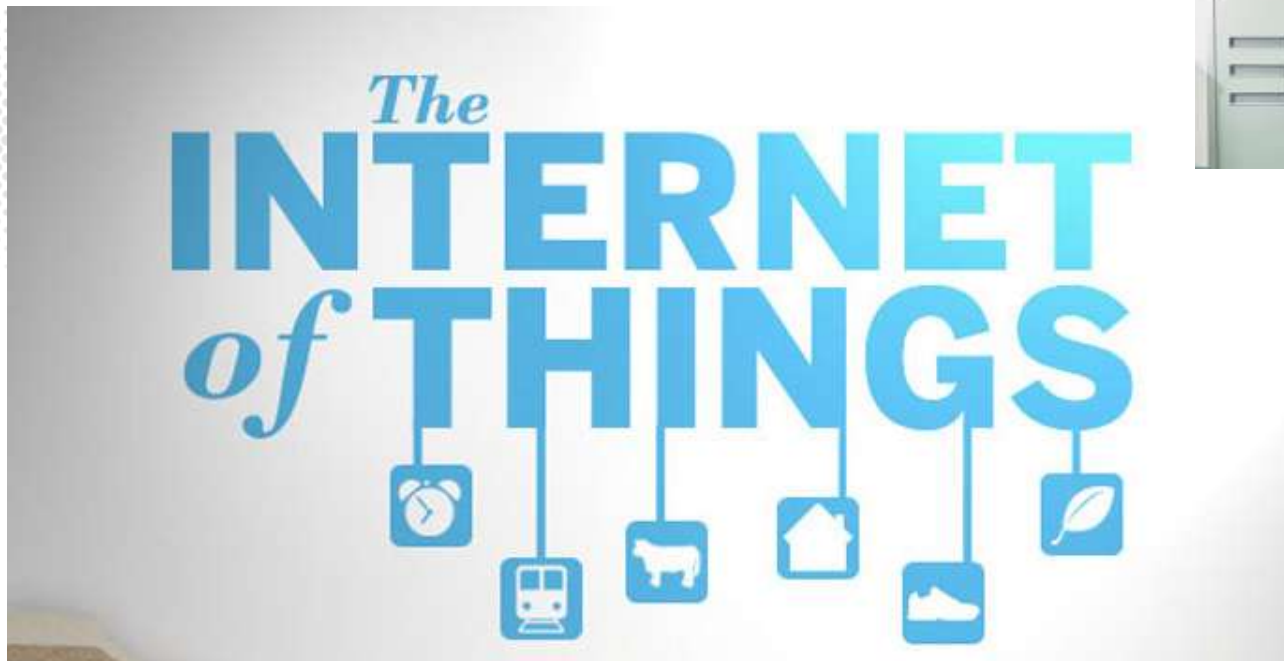
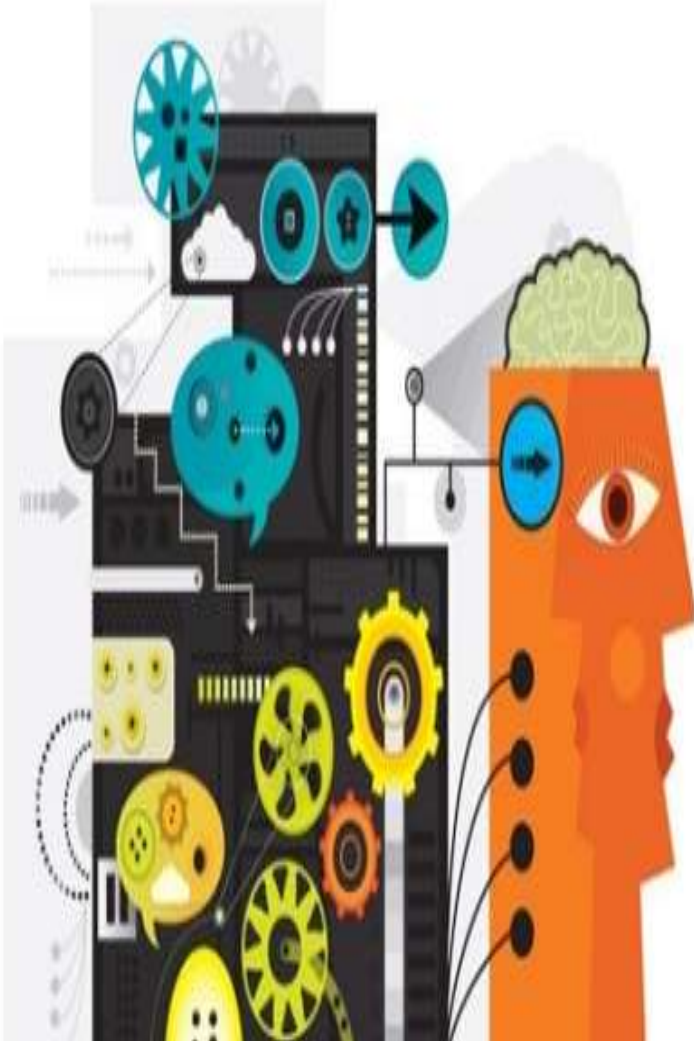


# Industry 4.0 and IoT: A Language for the Interoperability



## Industry 4.0. The real facts.

- The technology is not the content of I4.0, but a (compulsory ) enabling factor.
- The most empowering facts are:
  - The digitalization of the enterprise.
  - The digitalization of machinery, installation, sensing and metering.
  - The use of Internet Protocol for local and remote communication and interoperability.
  - The Things gone connected.
  - The diffusion of the Open Knowledge.



# IoT & I4.0

## The scope is anyway to make the things work together.



- Interoperability is the key word for I4.0.
- Interoperability is not a (pure) matter of technology. It is the way to make work together:
  - Machine to Machine.
  - Sensors to Control Systems.
  - Systems , Machines and Objects to Clouds.
  - All above to Humans.
- But also:
  - Humans to Humans.
  - Industry to Industry.
  - Humans (i.e. Customers) to Industries.

# IoT & I4.0



- Working together means to share the same language, with same meanings and without ambiguities, also M2M and H2M.
- Given as grant the Internet Protocol and the low cost and availability of communicating digital technologies, it is no longer a matter of “Field Bus”.
- The explosion of connected objects (IoT) rises dramatically the need of interoperability.

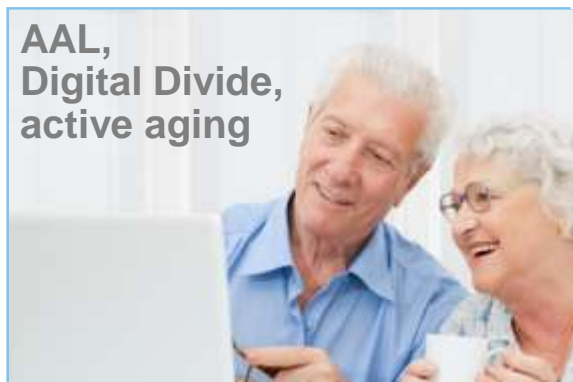
# IOT & I4.0



### Energy management

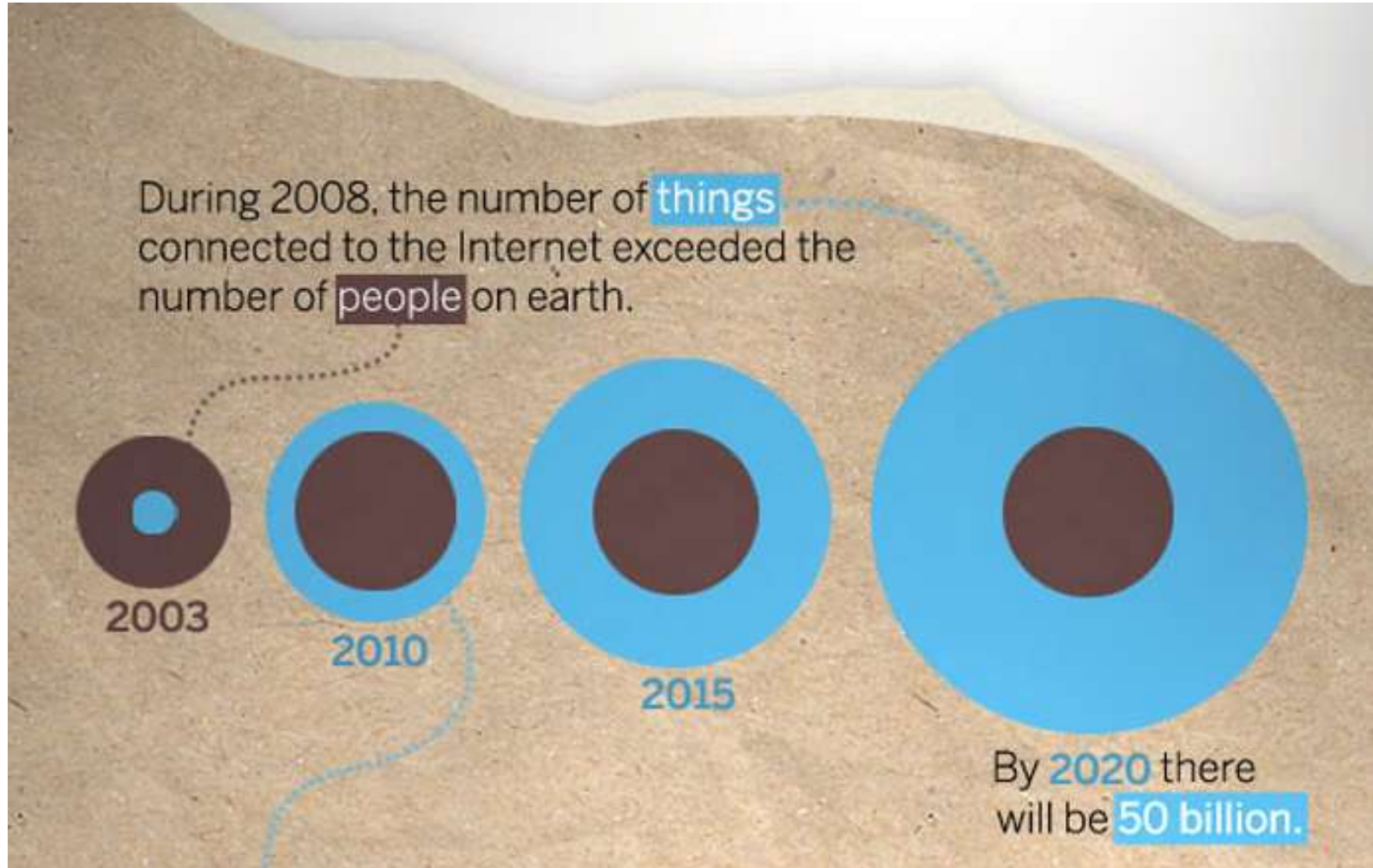
- Awareness
- Peak management
- Sources management
- Smart grid

The graphic features a hand pointing at a glowing lightbulb icon, symbolizing energy management. The background is a light blue gradient with faint lightbulb icons.

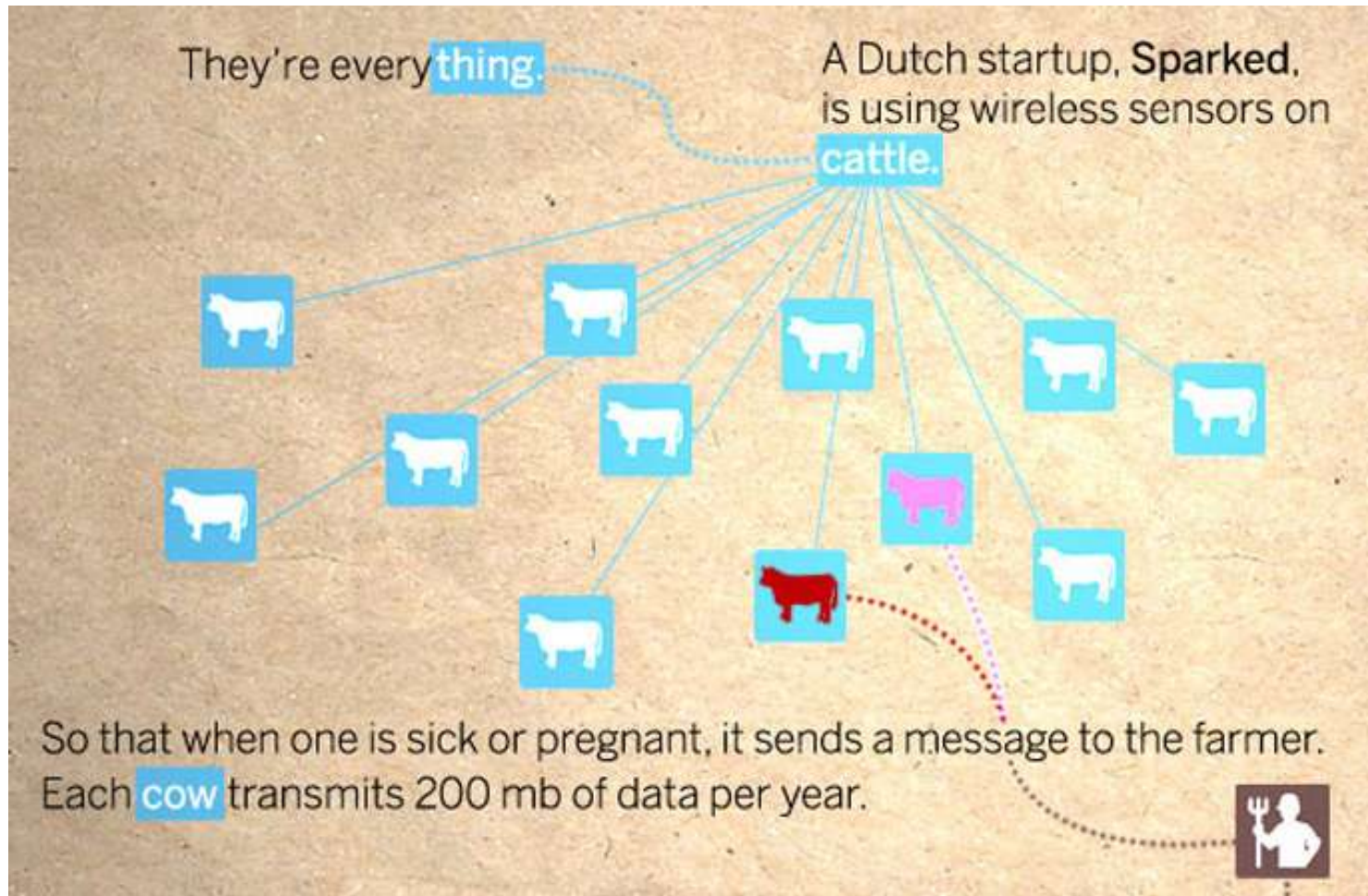


**In 2015 more than 25 billions of “things” will be connected.  
Almost all market segment is adopting IP technology**

# IoT & M4.0



# IoT & M4.0



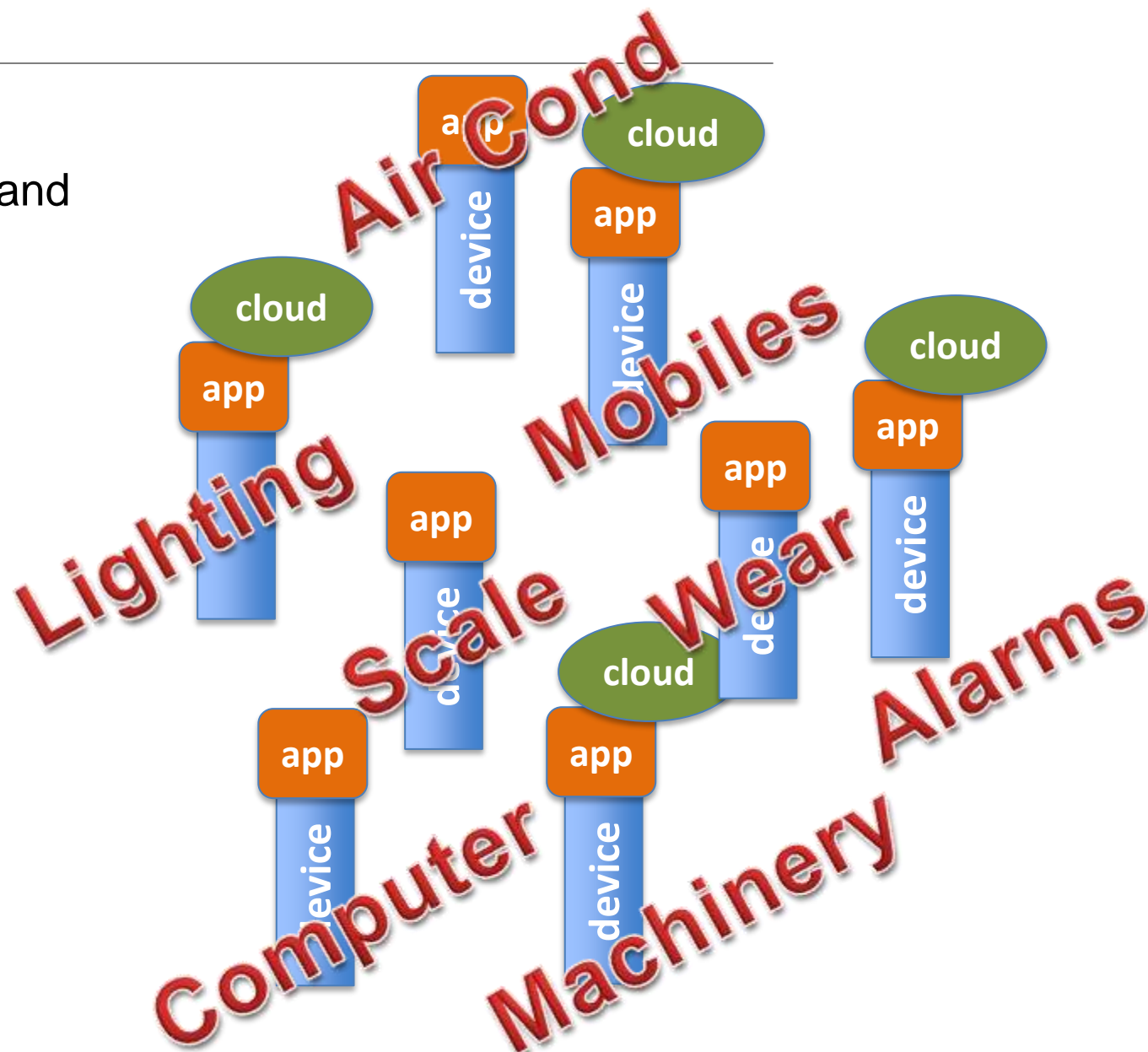
# IoT & M4.0





# IoT & M4.0

A Babel of apps, SW, command interfaces and portals is coming.



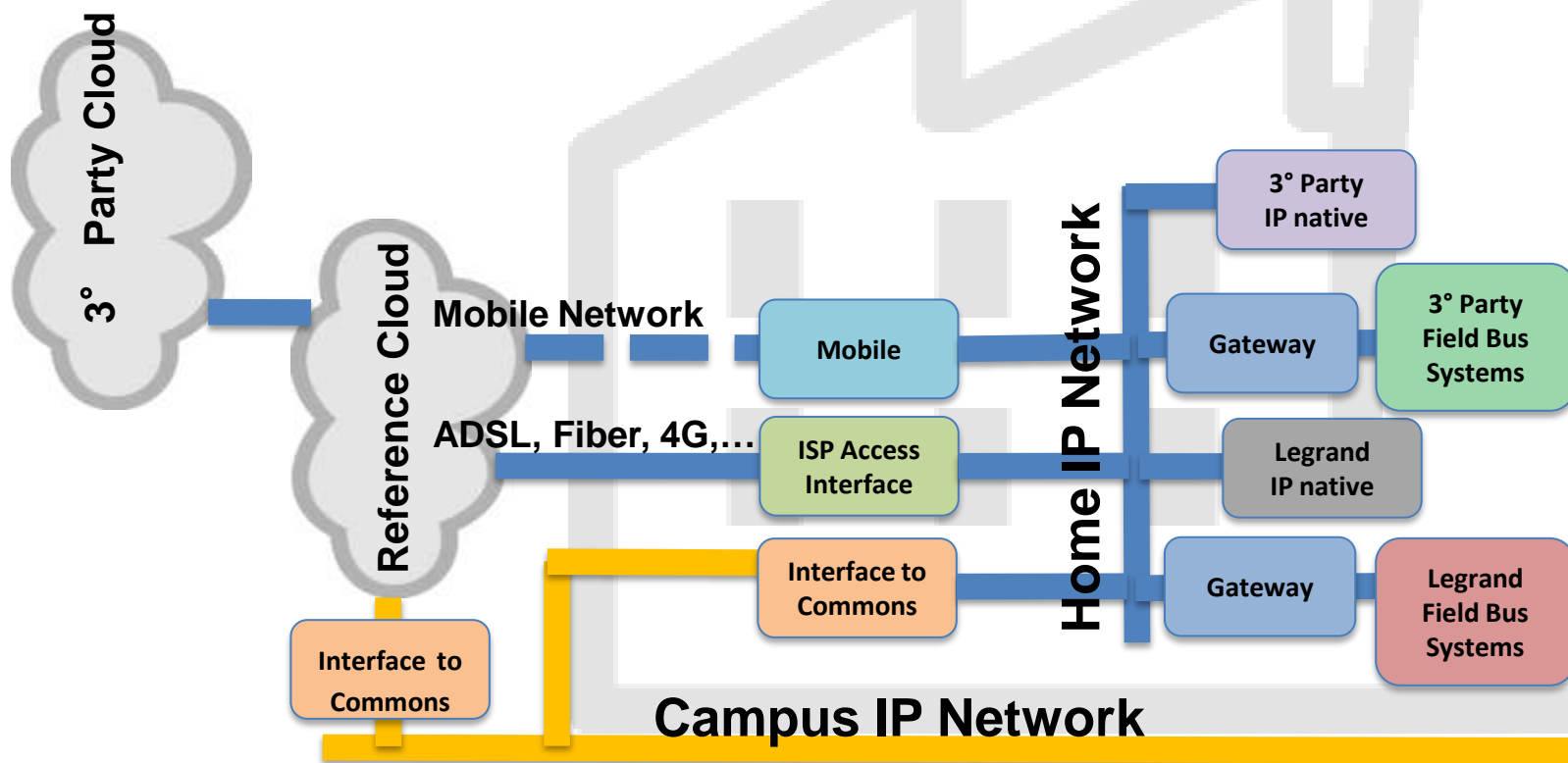
**BLOATWARE:**

The ensemble of scarcely or never used different APPs on your mobile.

# IoT & M4.0

## - Connected functions & smart objects

- System Architecture:



# IoT & M4.0

---

## The CAR: an example of an interoperable environment.

When you send a “going out” command to your car:

- The doors are closed
- The lights, radio and the HVAC are switched off
- The alarm is set on

When the navigator speaks to you:

- The information is displayed on the screens
- The music is set lower
- The fan speed is reduced if too noisy, etc.

When you regulate the temperature:

- You can choose the value for each person
- The ventilation is activated automatically
- If the external air is polluted, the air ducts are closed, etc.



## IoT & M4.0

---

**In a building, where you live more time than in a car, you cannot do normally anything of that.**

In fact, the car responds to one architecture of interoperability, as designed by the car manufacturer.

**For I4.0, the solution is based on:**

- One big provider, doing a lot of things. Many of them claim it, but no one can do everything (Neither, in the case, we want to be bound forever to him).

*either*

- An open approach, allowing many actors to intervene. Some integration works need to be done, but it's the only way when we sort out from our very perimeter.

# IoT & M4.0

---

**A logical solution: all connected objects need to speak the same language**

(open language consortia, initiatives, standardization )



Logic choice. But....

AS-i · BSAP · CC-Link Industrial Networks · CIP · CAN bus (CANopen · DeviceNet) · ControlNet · DF-1 · DirectNET · EtherCAT · Ethernet Global Data (EGD) · Ethernet Powerlink · EtherNet/IP · Factory Instrumentation Protocol · FINS · FOUNDATION fieldbus (H1 · HSE) · GE SRTP · HART Protocol · Honeywell SDS · HostLink · INTERBUS · MECHATROLINK · MelsecNet · Modbus · Optomux · PieP · Profibus · PROFINET IO · RAPIEnet · SERCOS interface · SERCOS III · Sinec H1 · SynqNet · TTEthernet

MTConnect · OPC DA · OPC HDA · OPC UA

1-Wire · BACnet · C-Bus · DALI · DSI · Factory Instrumentation Protocol · KNX · LonTalk · Modbus · oBIX · VSCP · X10 · xAP · xPL · ZigBee

IEC 60870 (IEC 60870-5 · IEC 60870-6) · DNP3 · Factory Instrumentation Protocol · IEC 61850 · IEC 62351 · Modbus · Profibus

ANSI C12.18 · IEC 61107 · DLMS/IEC 62056 · M-Bus · Modbus · ZigBee

AFDX · ARINC 429 · CAN bus (ARINC 825 · SAE J1939 · NMEA 2000 · FMS) · Factory Instrumentation Protocol · FlexRay · IEBus · J1587 · J1708 · Keyword Protocol 2000 · Unified Diagnostic Services · LIN · MOST · VAN



Medium term solution (?)

# IoT & M4.0

## Protocols versus Languages

- In our premises we have got a plenty of protocols, and the list is continuously growing.
- Only one is becoming ever present: the Internet Protocol (IP)



Ethernet



MY HOME  
GSM



HDMI  
HIGH DEFINITION MULTIMEDIA INTERFACE

ECHELON  
Bringing the Internet to ICS



WiFi

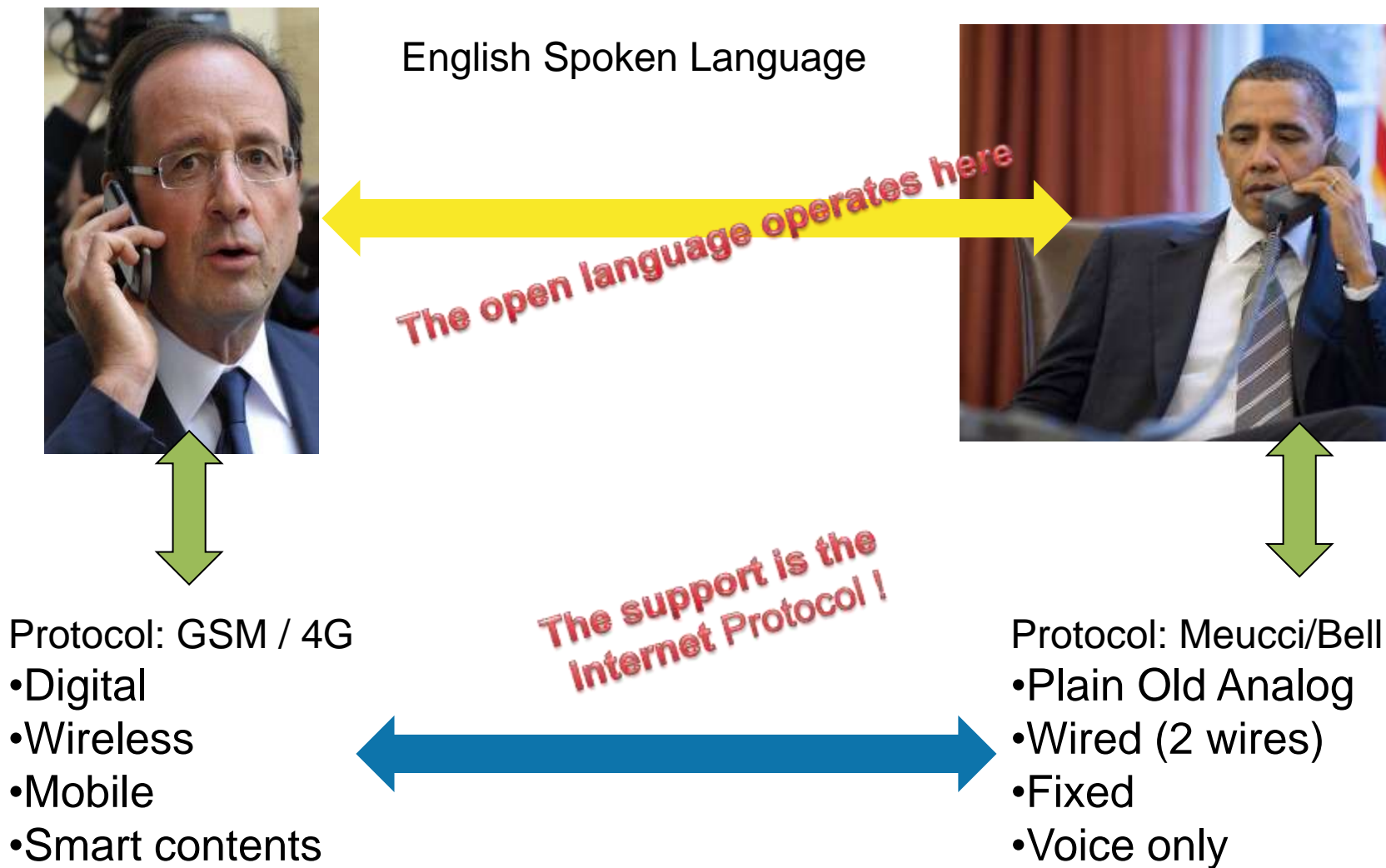
KNX

HI-SPEED  
CERTIFIED  
USB

Zwave



# IoT & M4.0



# IoT & Legrand

Legrand developed and currently uses an open language working at IP level



- OpenWebNet a public language for home automation

- **OpenWebNet** a language developed since 2000

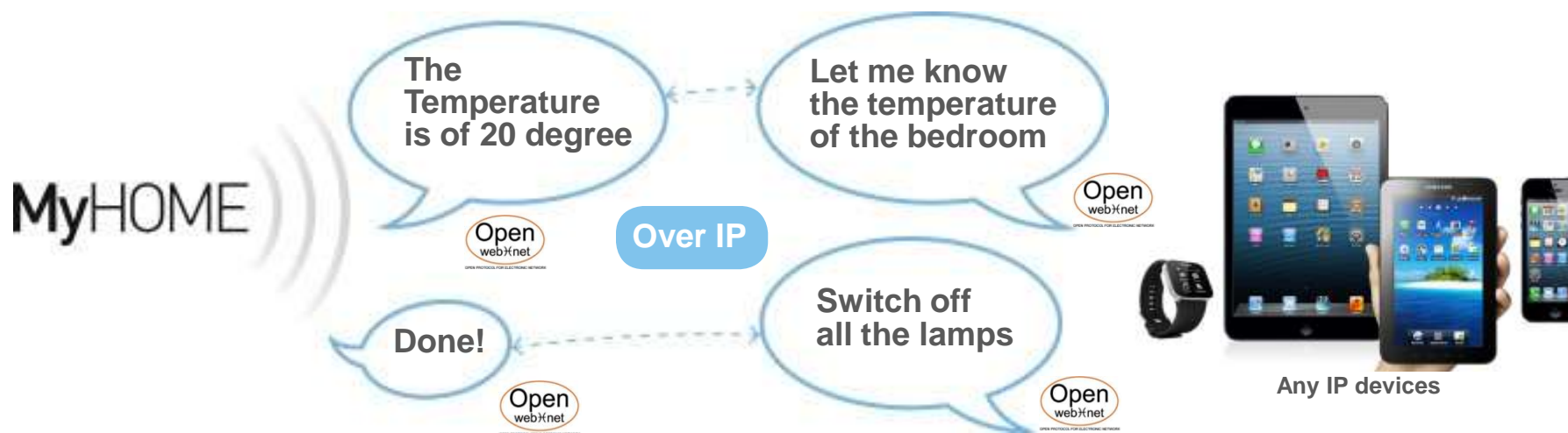


- MyOpen community
- **www.myopen-legrandgroup.com**

- **MyOpen community** a web community online since 2006



# IOT & M4.0



- Born in 2000 and freely available since 2006
- Introduce an **abstraction level** that allows the supervision and control of any home automation system (not only MyHome) by concentrating on the functions
- OpenWebNet is a “**standard de-facto**”
- In a **connected world** OpenWebNet is playing a very important role
  - Able to make the “Home Automation” a “thing” of the “**Internet of things**”
  - It generates business enabling interoperability (plenty of devices are able to “speak openwebnet” and has been developed and sold)



# IOT & M4.0

## + 15'000 USERS

Grammars and vocabulary  
are freely available here:

[www.myopen-legrandgroup.com](http://www.myopen-legrandgroup.com)

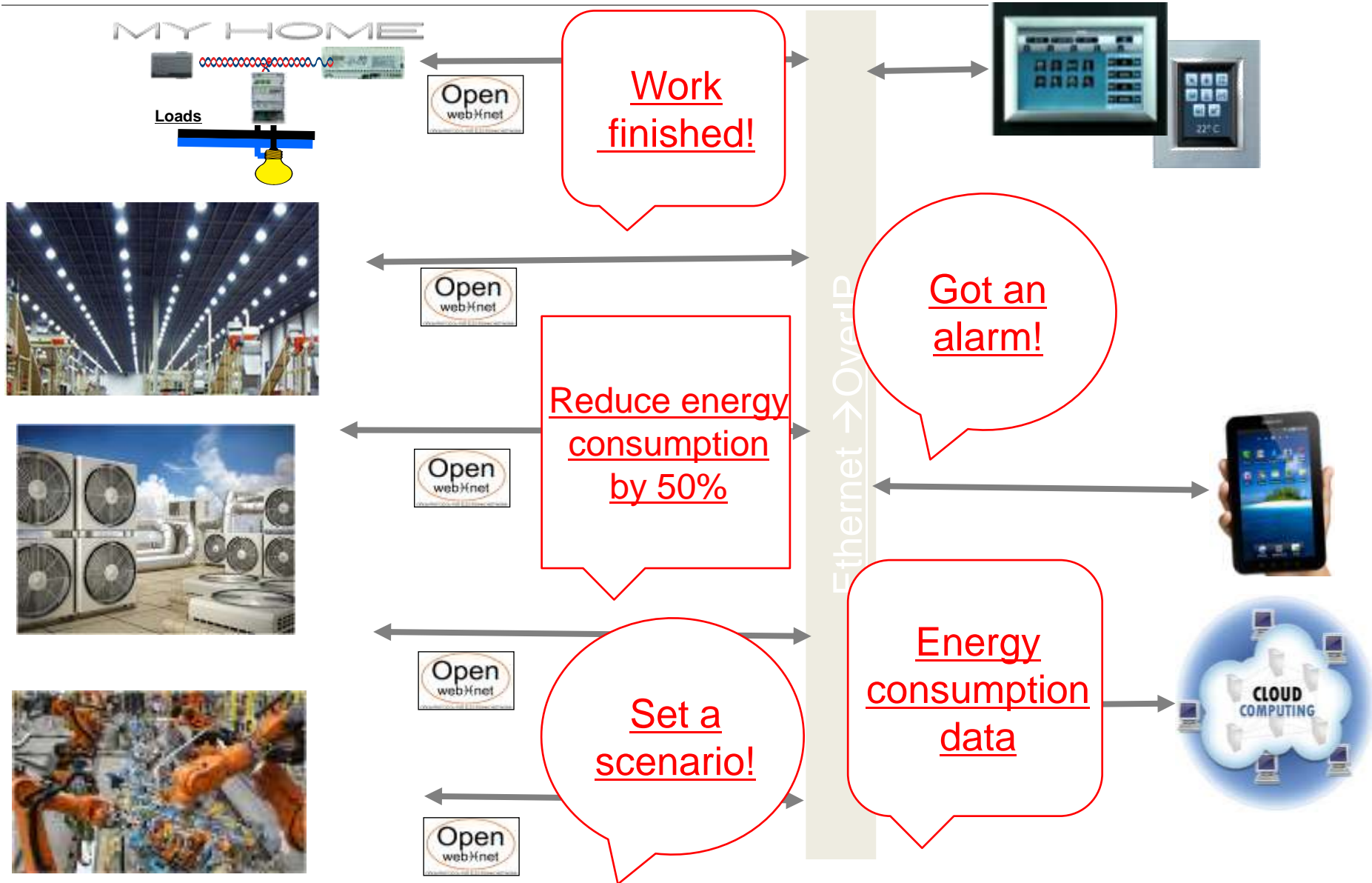


MyOpen went on line the **2006**; since then  
(thanks to the so “openess” approach),  
everyone could, can and will be able to:

- improve the “words” of openwebnet language to describe functionalities not covered till now
- develop and promote their own solutions (device, software, etc) openwebnet compliant

**O** PEN  
**P** ROTOCOL for  
**E** LECTRICAL  
**N** ETWORK

# IoT & M4.0



# IoT & M4.0

...but what if we need to interoperate with 3<sup>rd</sup> party's proprietary languages ...



...to comply our customer needs (and possibly to get some honest money from that just now)?

# IoT & M4.0

---

## 2 KIND OF OBJECTS:

### 1) DRIVER MANAGER:

A generic web operate able to be hosted by many kind of IP devices on the installation.

It's the **engine moving** the game, the **stable part**.

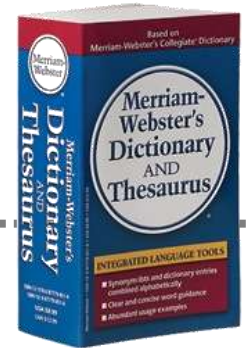
### 2) DRIVERS:

One or more replaceable drivers **speaking the 3<sup>rd</sup> party proprietary language**.

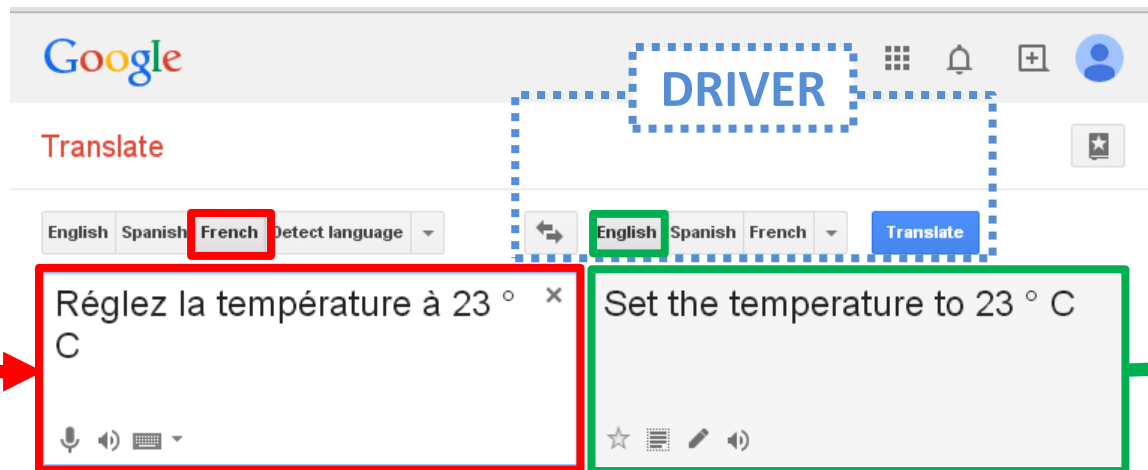
Quickly and easily developed, they form a repository, if available. The operation of mounting a driver on the manager is straightforward.



## DM WORKS LIKE A WEB TRANSLATOR



**DRIVER MANAGER**



**DRIVER MANAGER:** works like a web translator

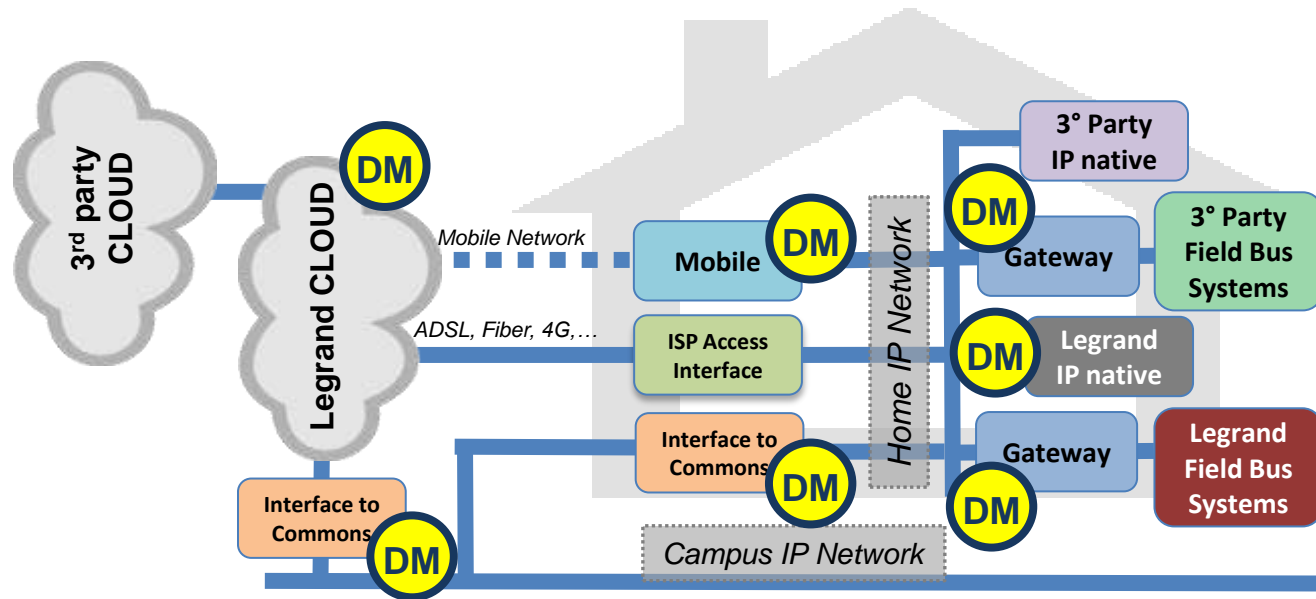
The translation tool works on internet as a web site M2M (local or remote)

**DRIVER:** Choice of language.

If does not exist you can create it on fly by web

# IoT & M4.0

## THE DRIVER MANAGER CAN BE PLACED ON MANY DEVICES



HomeTalk A&PWG

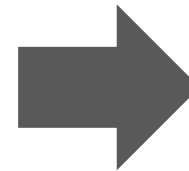
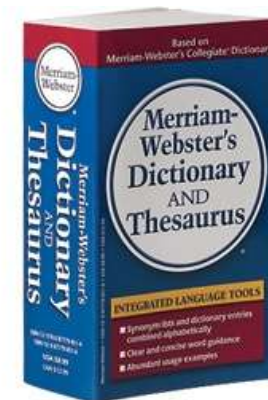


# IoT & M4.0

## INTEROPERABILITY PROPRIETARY PLATFORM



## SOFTWARE

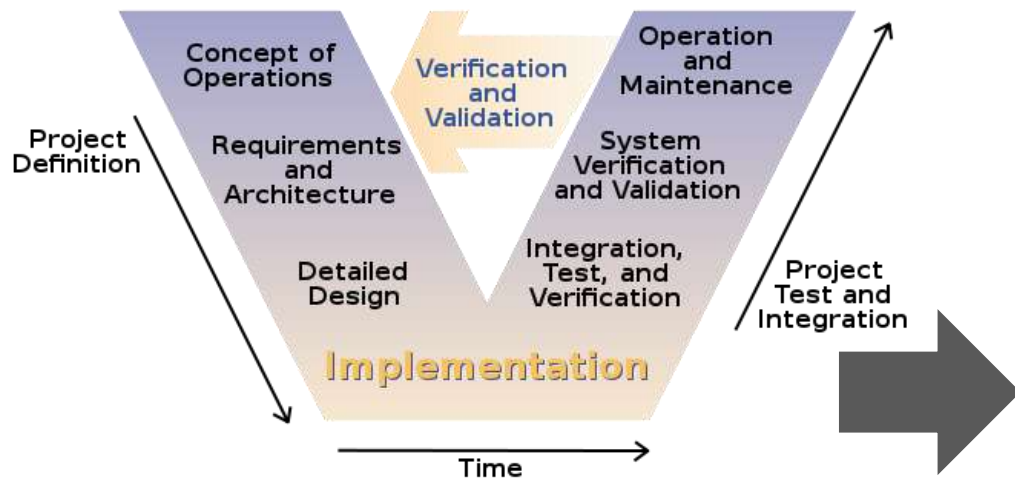


**INTEROPERABILITY PROPRIETARY PLATFORMS** (i.e. SFR box, Revolve, Tahoma, ...) **can be replaced by SOFTWARE** (+ a bus to IP converter, if need)

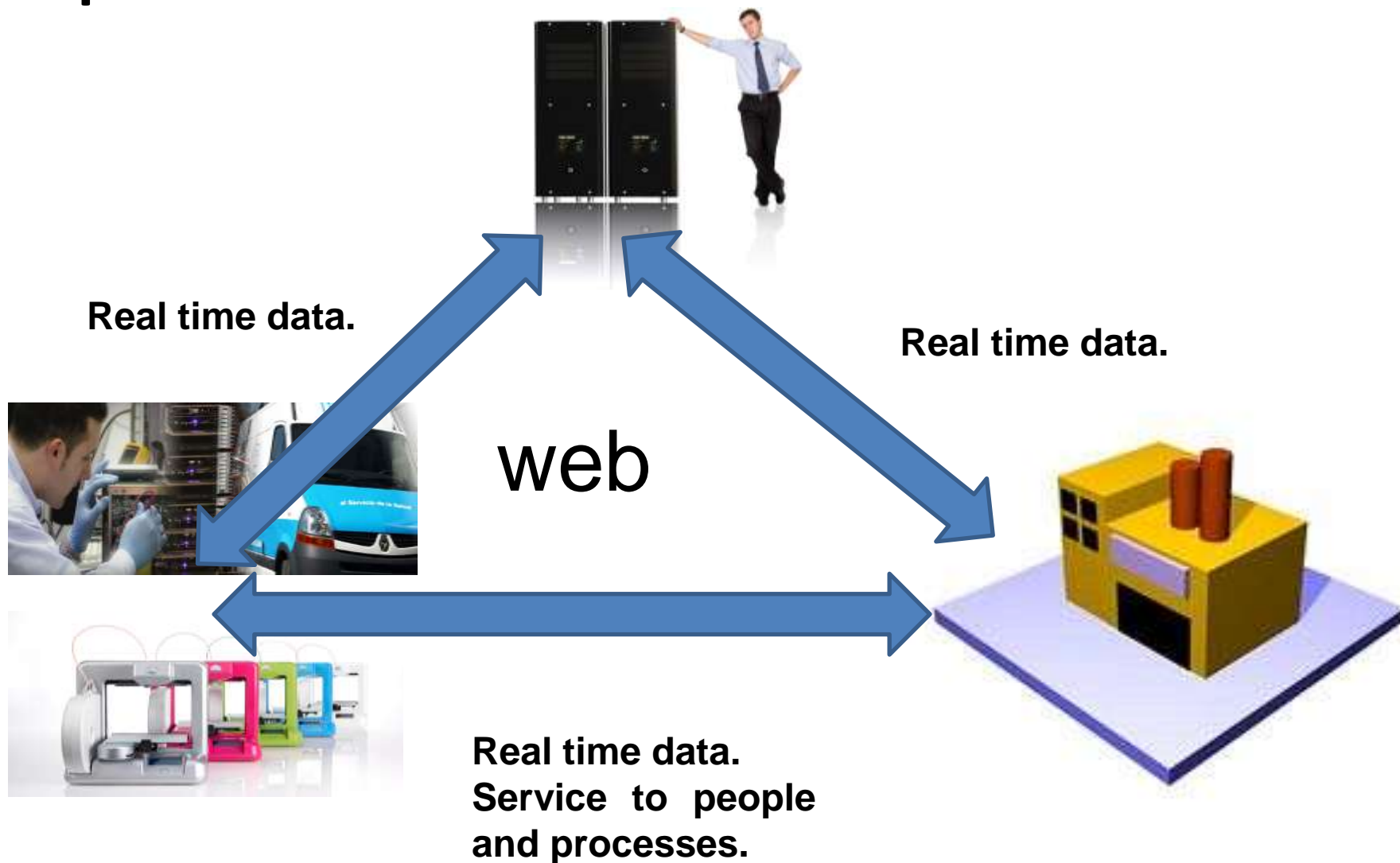


**the V-METHOD of development  
is converted to  
“DO JUST NOW, TRY AND REFINE”**

**LESS R&D, MORE TECHNICAL MKT SUPPORT.**



## The public architecture



# IoT & M4.0

## - Data security & data access.

Security and privacy issues are becoming more and more important, when a lot of smart objects are connected to IP.

Newcomers in IoT tend to underestimate that point, making possible the hacking of the home LAN via “smart object” hacking (botware).

For that reason Legrand has got the **ISO 27001 certification** on this IoT serving Cloud. Other evolutions and patents are also currently in deployment.



# IoT & Legrand

