



# IoT, Open Innovation and Open Source Communities

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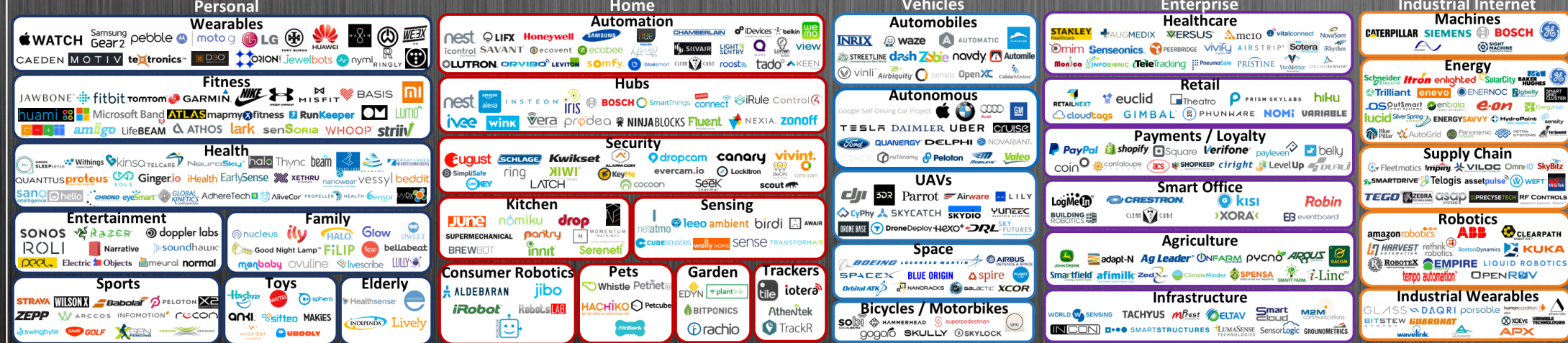
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# Internet of Things Landscape 2016

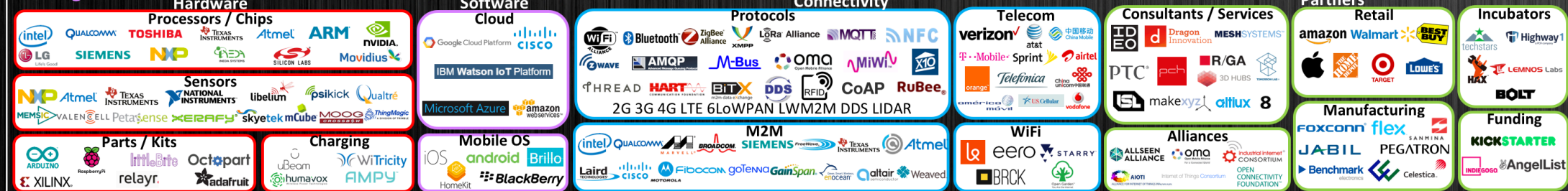
## Applications (Verticals)



## Platforms & Enablement (Horizontals)



## Building Blocks



© Matt Turck (@mattturd), David Rogge (@davidirogge) & FirstMark Capital (@firstmarkcap)

FIRSTMARK



**Today, IoT looks like this:  
“Internet of Silos”**







**We would like to see IoT look like that:  
Internet of Things**

**Interoperability  
Open Standards**



# HOW STANDARDS PROLIFERATE:

(SEE: A/C CHARGERS, CHARACTER ENCODINGS, INSTANT MESSAGING, ETC)

SITUATION:  
THERE ARE  
14 COMPETING  
STANDARDS.

14?! RIDICULOUS!  
WE NEED TO DEVELOP  
ONE UNIVERSAL STANDARD  
THAT COVERS EVERYONE'S  
USE CASES.



SOON:

SITUATION:  
THERE ARE  
15 COMPETING  
STANDARDS.

**One way to create a standard:  
Make your own !**



Another way:  
Involve adopters of these standards!

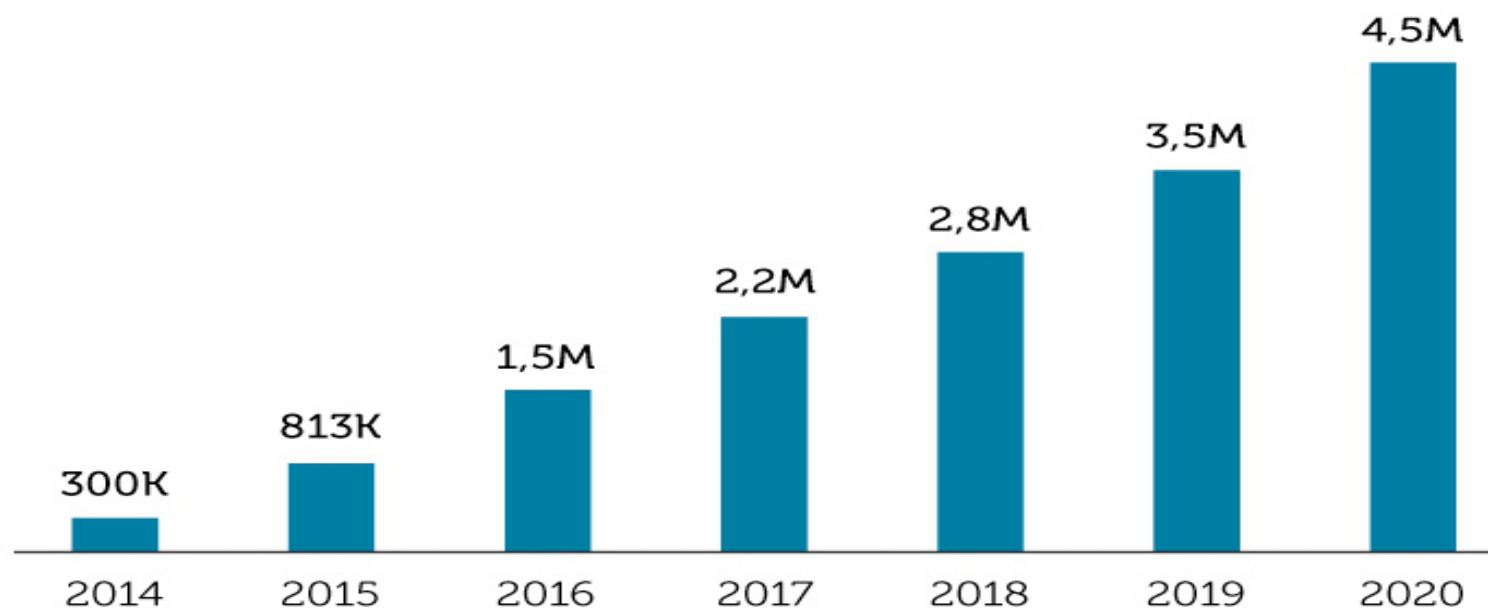
**Developers !**



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## THE NUMBER OF IOT DEVELOPERS 2014-2020

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**Source:** VisionMobile estimates, 2014



**Report:** IoT: Breaking Free From Internet And Things | [vmob.me/IoT](http://vmob.me/IoT)

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<http://tinyurl.com/zcgchb7>

# IoT DEVELOPER SURVEY

APRIL 2016



<https://iot.eclipse.org>

 [@EclipseIoT](https://twitter.com/EclipseIoT)



IEEE  
Internet of Things

<http://iot.ieee.org>

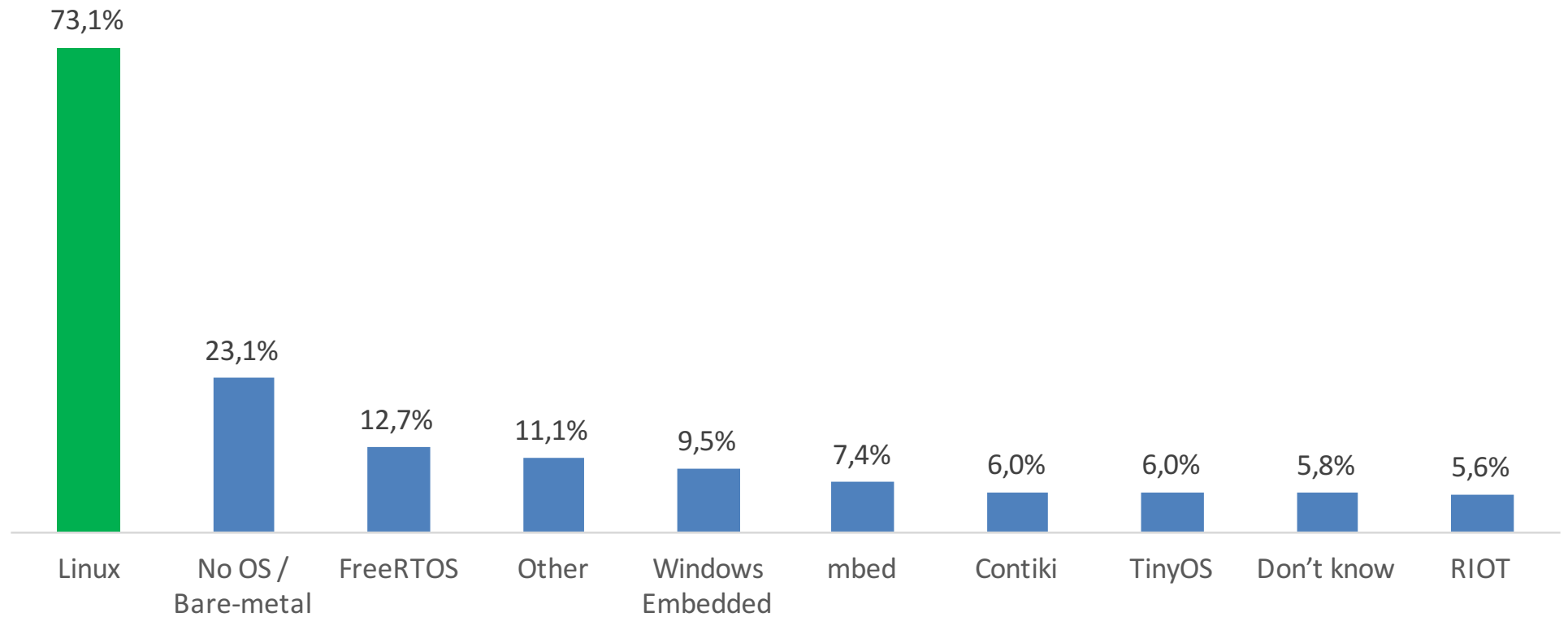
 [@IEEEIoT](https://twitter.com/IEEEIoT)



<http://agile-iot.eu>

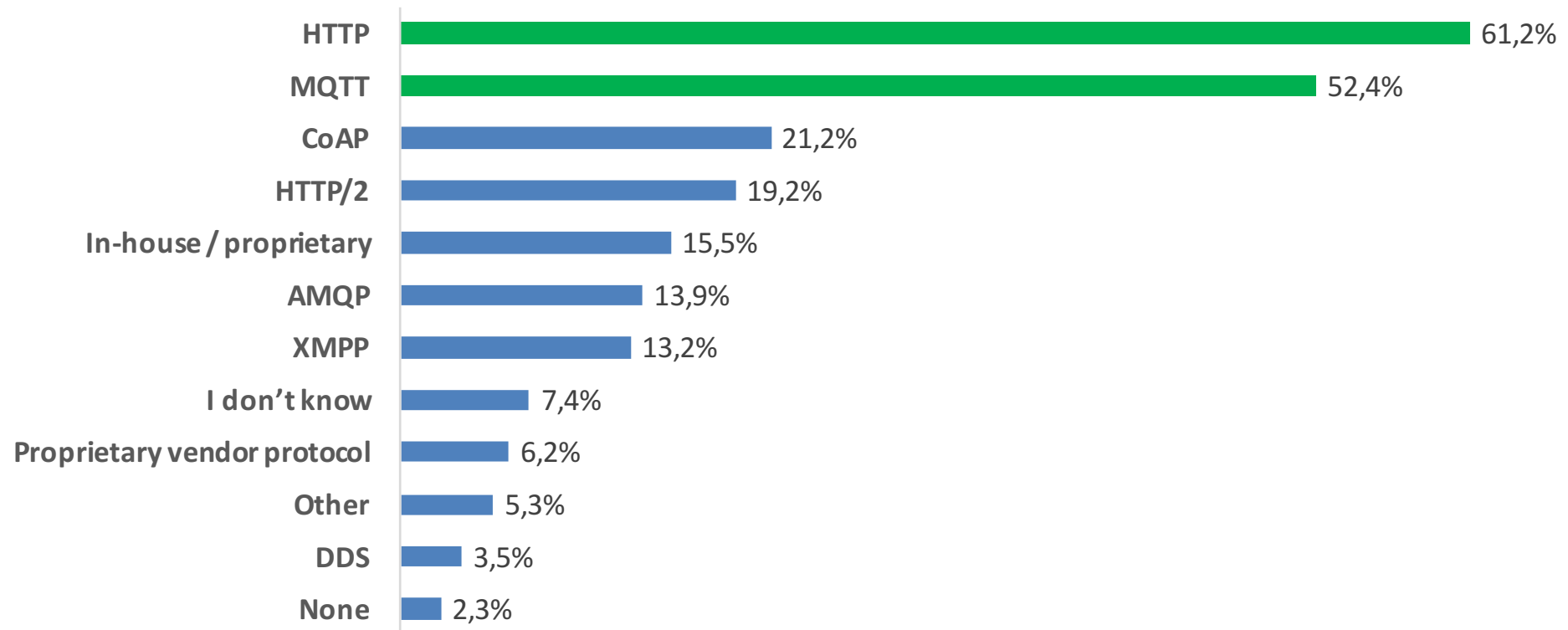
 [@agile\\_iot](https://twitter.com/agile_iot)

# Which operating system(s) do you use for your IoT devices?



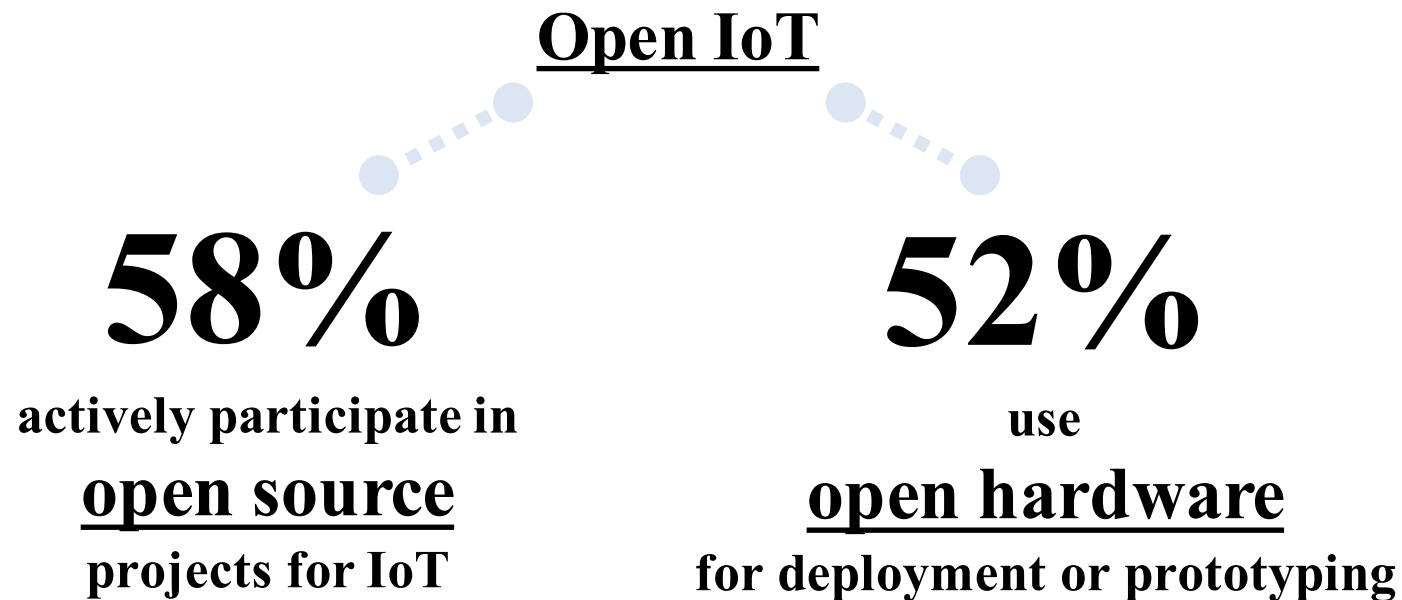


# What messaging protocol(s) do you use for your IoT solution?





# Key Findings







# Why do they use Open Source ?

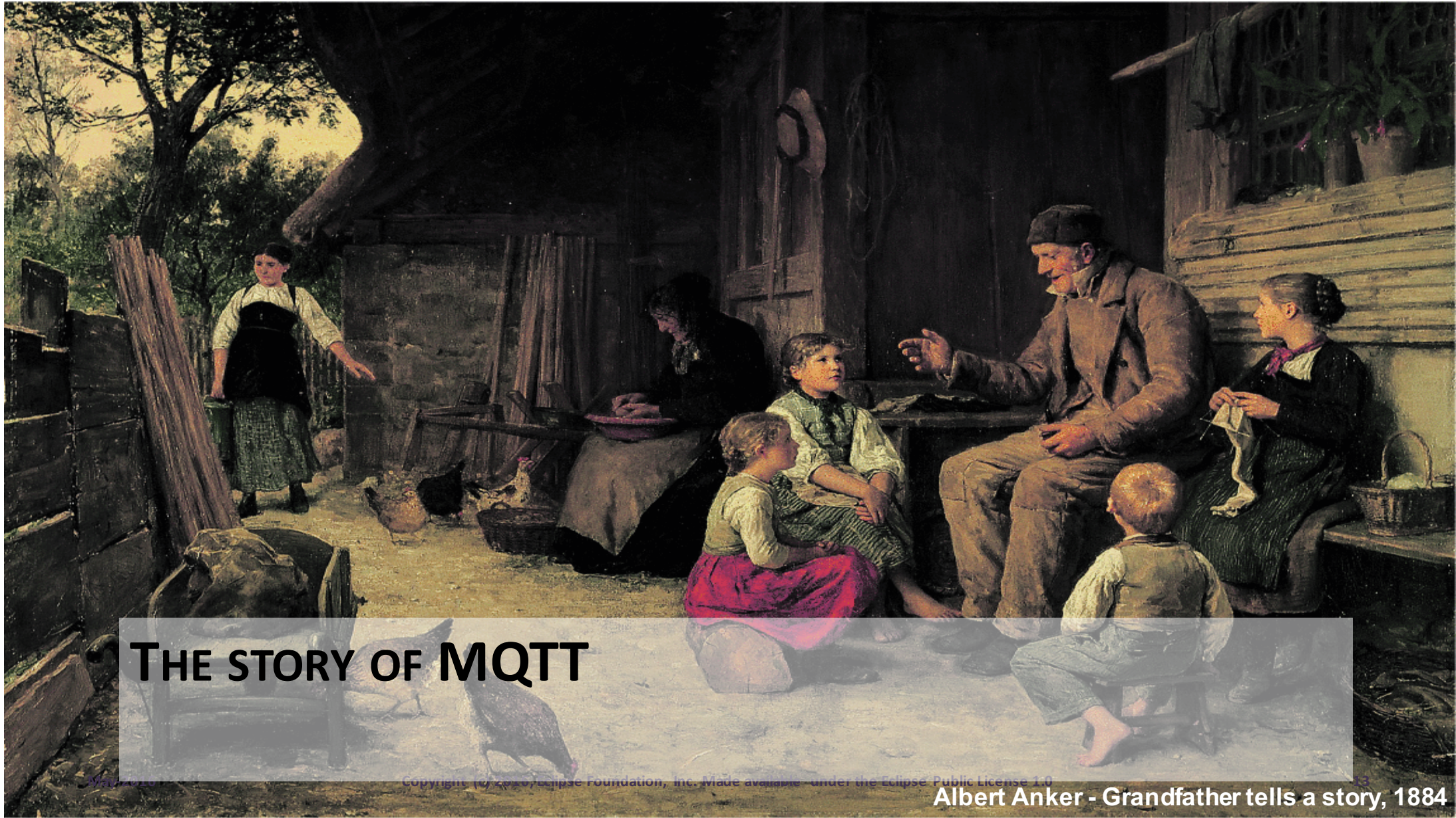
- **Because they make money with it !!**

- Maturity of the model
- Investment
  - Cost of acquisition
  - Team training
- Mutualized maintenance
  - ➔ **Lower total cost of ownership**



**➔ Time to Market !**





# THE STORY OF MQTT

Copyright (c) 2020 Eclipse Foundation, Inc. Made available under the Eclipse Public License 1.0  
Albert Anker - Grandfather tells a story, 1884



Interest over time ?

# Google Trend

News headlines ? Forecast ?

## MQTT Now an ISO/IEC Standard

By [Steve Borsch](#) | January 31, 2016 | 0

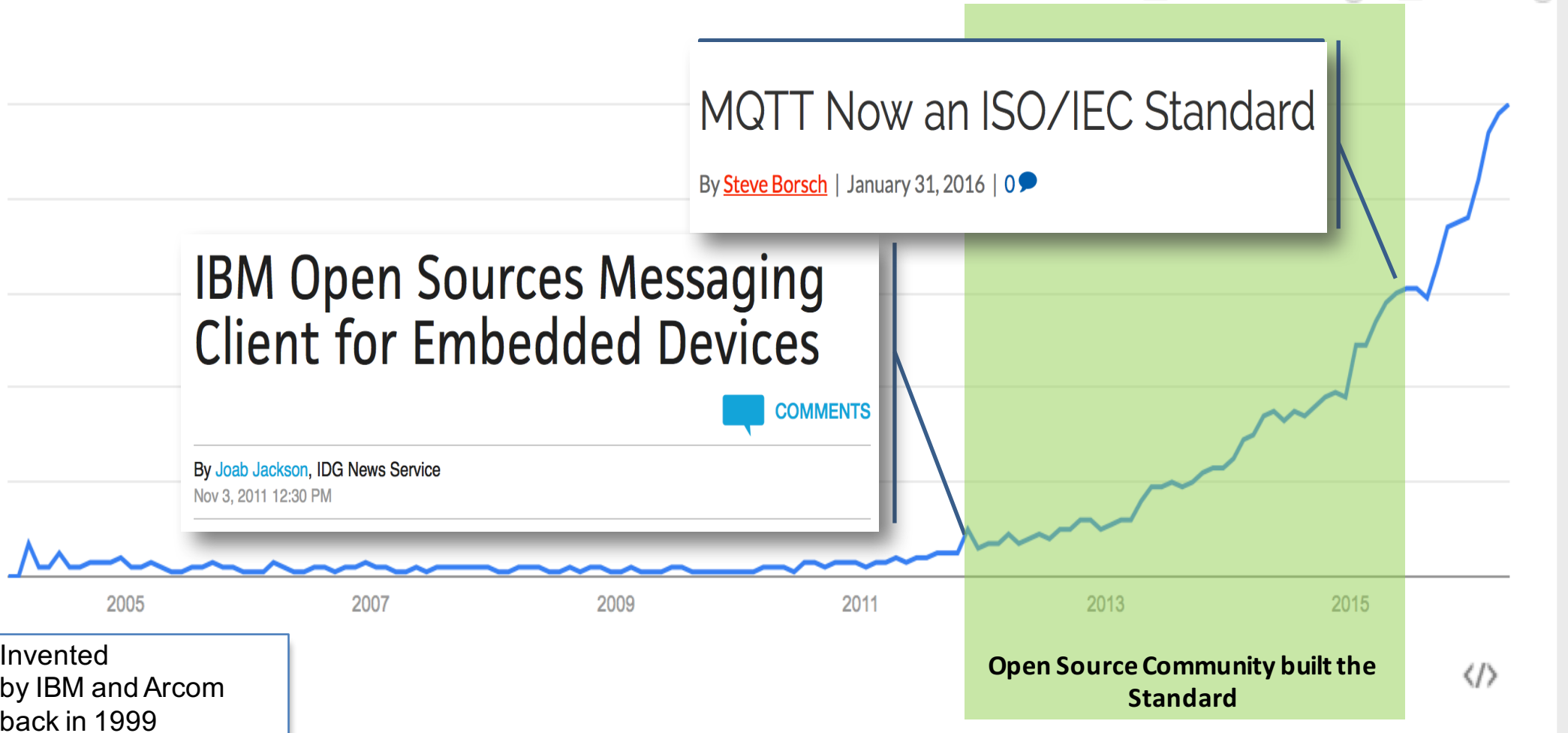
## IBM Open Sources Messaging Client for Embedded Devices

COMMENTS

By [Joab Jackson](#), IDG News Service  
Nov 3, 2011 12:30 PM

Invented  
by IBM and Arcom  
back in 1999

Open Source Community built the  
Standard

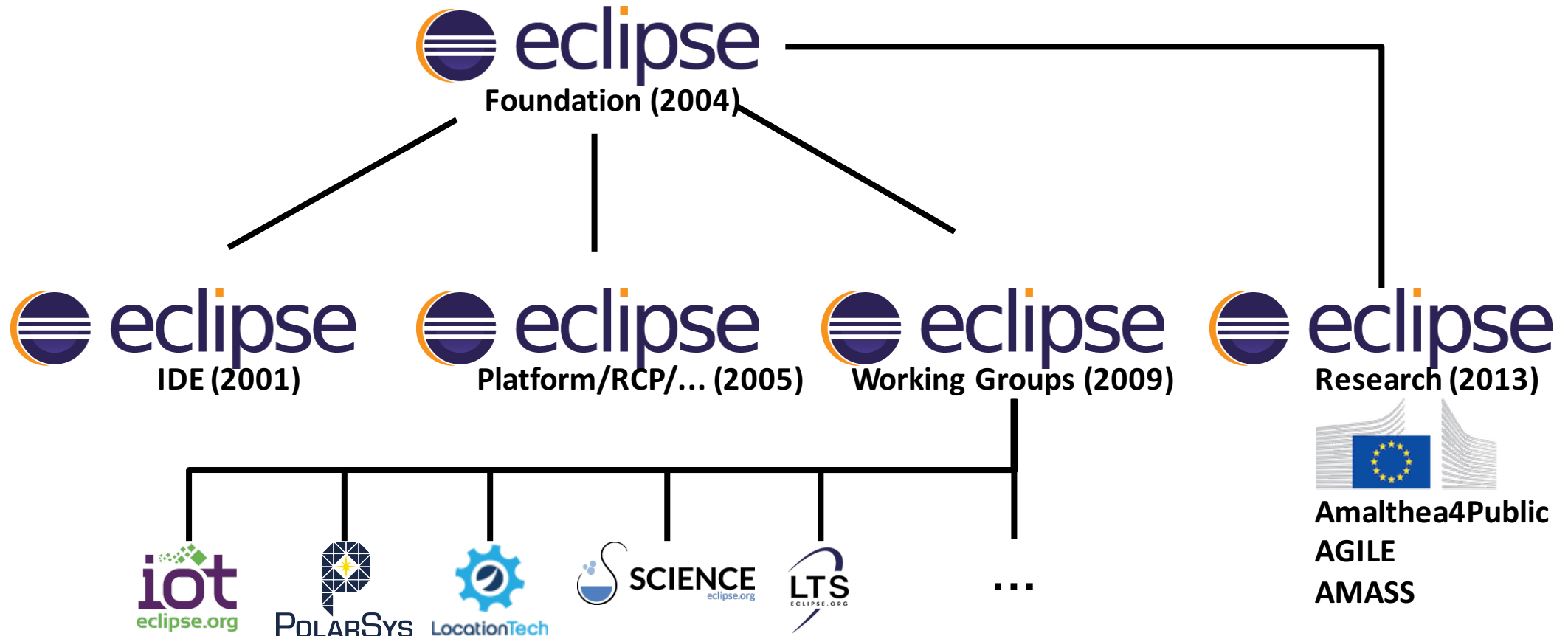




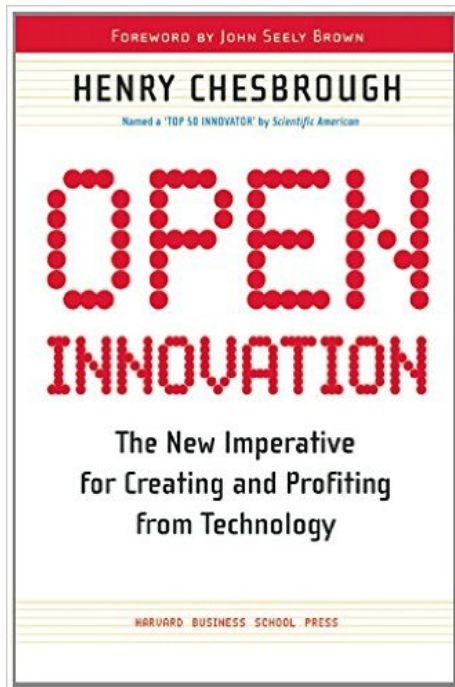
# LET'S TALK ABOUT ECLIPSE



# Eclipse is all about Building Communities



# Eclipse is all about Open Innovation



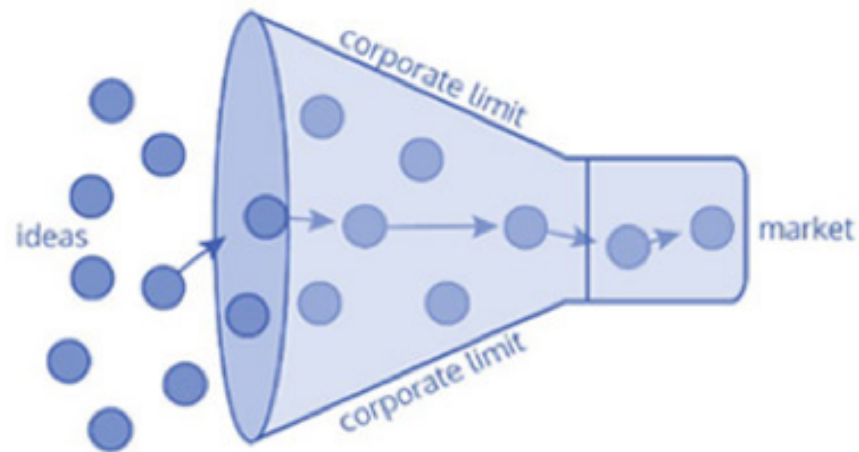
*“Open Innovation is a paradigm that assumes that firms can and should **use external ideas** as well as **internal ideas**... The Open Innovation paradigm **treats R&D as an open system**. Open Innovation is sometimes **conflated with open source** methodologies for software development... While open source shares **the focus on value creation** throughout an industry value chain, its proponents usually deny or downplay the importance of **value capture**.”*

**Henry Chesbrough,**  
Open Innovation: The New Imperative (2003)

# Close Innovation vs Open Innovation

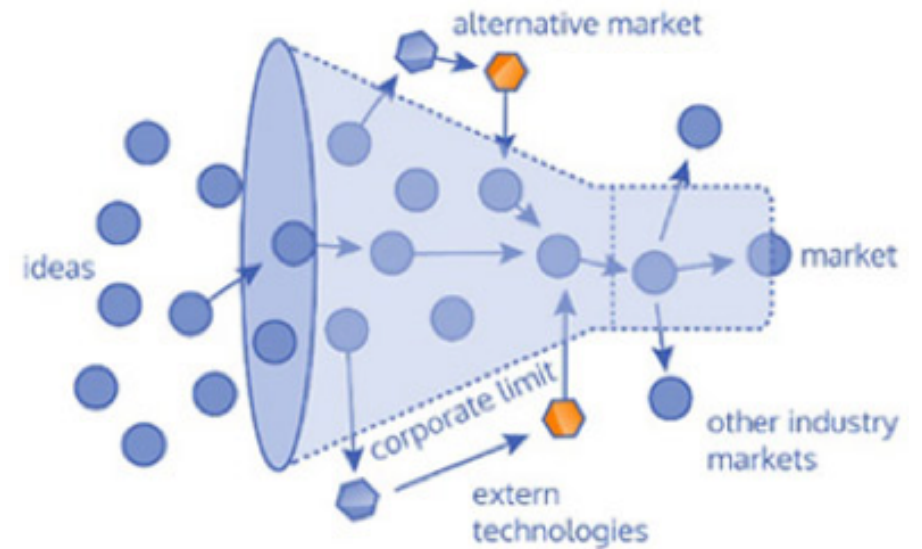


Closed Innovation Model



Past

Open Innovation Model



Present

<http://bock-pm.com/service/open-innovation/>



# 80 / 20 rule for Open Source



**Business  
Friendly !**



**Focus on your  
added value**

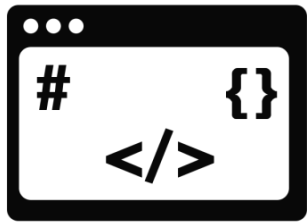
**Co-develop the platform /  
standards in collaboration  
with others**



**Founded in late 2011 by**

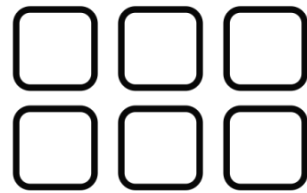
- **IBM**
- **Eurotech**
- **Sierra Wireless**

## Eclipse IoT by Numbers



**2**

**MLOC**



**22**

**projects**



**150+**

**developers**



**100K**

**monthly  
visitors**



## Projects

Our open source projects provide implementations of IoT standards, as well as horizontal and industrial frameworks.

<http://iot.eclipse.org/projects>

## Standards

And much more...

### 4DIAC

4DIAC in its current form has been started 2007 as open source project fostering the further development of IEC 61499 for its use in distributed IPMCS and further distribute research results from the...

[Read more](#)[Download](#)

### Californium

Californium (Cf) is an open source implementation of the Constrained Application Protocol (CoAP). It is written in Java and targets unconstrained environments such as back-end service infrastructures...

[Read more](#)[Download](#)

### Concierge

Concierge is a small-footprint implementation of the OSGi Core Specifications R5 standard optimized for mobile and embedded devices.

[Read more](#)[Download](#)

### Leshan

Leshan is an OMA Lightweight M2M (LWM2M) implementation in Java. Eclipse Leshan relies on the Eclipse IoT Californium project for the CoAP and DTLS implementation. It is tested against...

[Read more](#)[Download](#)

### Milo

OPC Unified Architecture is an interoperability standard that enables the secure and reliable exchange of industrial automation data while remaining cross-platform and vendor neutral. The...

[Read more](#)[Download](#)

### Mosquitto

Eclipse Mosquitto provides a lightweight server implementation of the MQTT and MQTT-SN protocols, written in C. The reason for writing it in C is to enable the server to run on machines which do not...

[Read more](#)[Download](#)

### OM2M

The OM2M project is an open source implementation of the ETSI M2M standard. It provides a framework for developing services independently of the underlying network and aims to facilitate deployment of...

### Paho

The Paho project provides reliable open-source implementations of open and standard messaging protocols aimed at new, existing, and emerging applications for Machine-to-Machine (M2M) and Internet of...

### Paho Incubator

A permanent incubator for Paho. A permanent incubator is a project that is intended to perpetually remain in the incubation phase. Permanent incubators are an excellent place to innovate,...



# Commercial Ecosystem



# Open IoT Stack









# AGILE: Adaptive Gateways for diverse multiple Environments

- AGILE builds a modular hardware and software gateway for the Internet of Things with support for:
  - protocol interoperability,
  - device and data management,
  - IoT apps execution,
  - and external Cloud communication,
- Featuring diverse Pilot Activities, Open Calls & **Community building**.



For further information:

<http://www.agile-iot.eu>



@agile\_iot

# MEET THE ECLIPSE COMMUNITIES !



**eclipsecon**  
France 2016

**Toulouse, France · June 7 - 9, 2016**

<https://www.eclipsecon.org/france2016>



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