

# Cloud IoT platforms: a solid foundation for the future Web or a temporary workaround?

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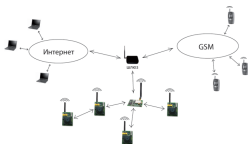
National Research University  
Higher School of Economics

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# Our background

We represent a research laboratory - WiseNetLab. For the last 7 years we have been conducting research and working on applied projects in the following areas:

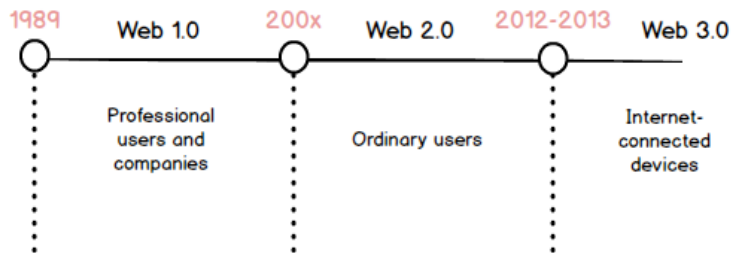
- Sensor networks
- Multi-protocol wireless gateways
- Smart things
- IoT platforms



## Before IoT platforms emerged

- Each manufacturer maintained its own specialized system for managing smart devices
- Proprietary protocols were used
- Complete non-compatibility between devices from different manufacturers

# Web evolution



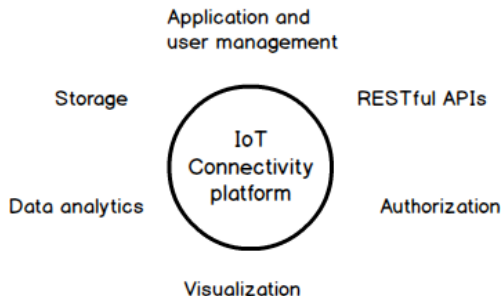
We can define transitions between Web generations based on the type of the predominant **content** originator

Participative Web: User-created content. OECD 2007

## Raw device data -> content

- Each device stores its own data and is accessible by its unique address
- Integration devices (gateways)
- Middleware platforms

# Common functions



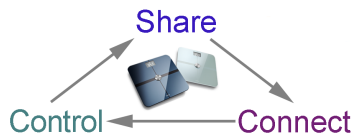
In 2012 we started developing our own Web of Things platform.

Major solutions at the time:

- Cosm
- Axeda
- Evrything

# The Thingier platform

- Started in 2012 as a Social Web of Things<sup>1</sup> platform
- In 2014 we switched to the concept of a highly customizable IoT platform

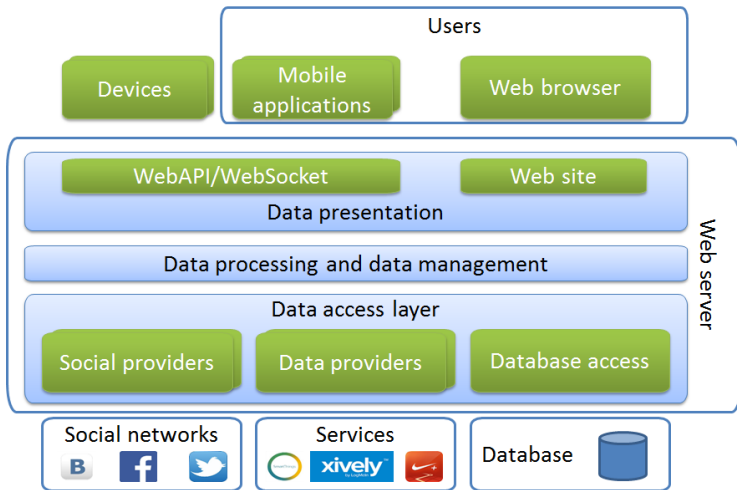


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<sup>1</sup>social-iot.org

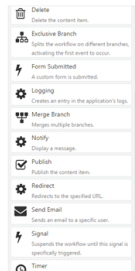
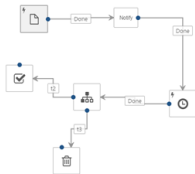


# Thinger architecture



# Thinger customization

- Theming based on user or DNS redirect
- Integrated script engine
- Installable applications
- Graphical widget and scenario editor



# IoT platforms (2015)



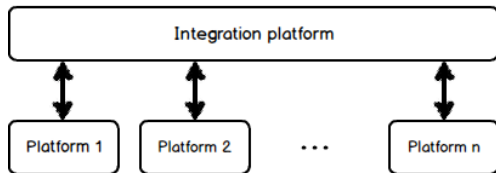
- Disjoint ecosystems of smart devices
- IT industry leaders have started to spread into the IoT platforms market
- “A lot of different players are trying to clean things up”<sup>1</sup>

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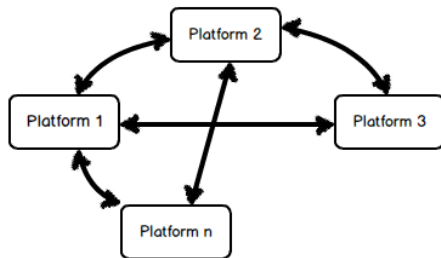
<sup>1</sup>A. Greengart, Current Analysis

# Platform mashups

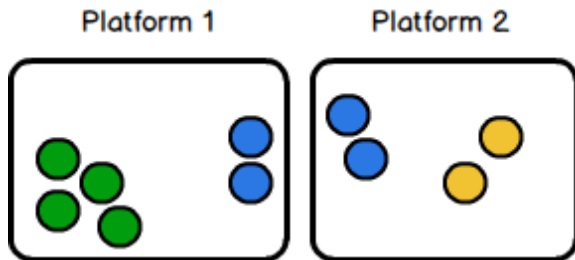
Option 1



Option 2



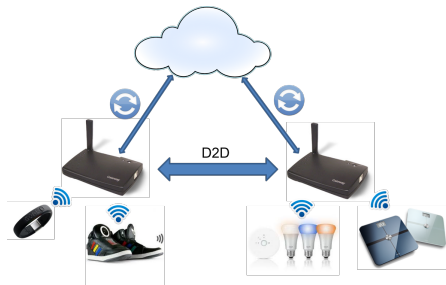
# From device platforms to service platforms



- The end user is often more interested in services rather than in managing individual devices
- Devices forming a service can belong to different IoT platforms

# From cloud to fog computing <sup>1</sup>

- Some of the cloud platform functions (e.g. data storage, interaction scenarios) can be brought down closer to devices:
- Emerging D2D technologies can be used for direct communication between the gateways



<sup>1</sup>F. Bonomi et al. Fog computing and its role in the Internet of Things. In Proc. of MCC '12. ACM, NY, USA

- Adaptive protocol for the Web of Things
- Device/service discovery
- Asynchronous communication
- ThingerBox (integration gateway)

Thank you for your attention!