

Statement of Interest

Author : Arnaud Braud (Orange)

Introduction

Definitions

Finding precise definitions for Internet of Things, IoT, Machine 2 Machine, M2M, and Internet of Objects, IoO, is not easy [1]. IoT is a broad term that refers to a next generation Internet that not only connects people's devices, but also enables objects or machines to connect to each other, to exchange information, or perform actions without human intervention. M2M is more specific to connecting machines that do not provide a human interface (e.g., sensors, actuators) powered with electricity (battery or power grid). IoO is rather related to passive objects (non-electrically powered) with technologies such as RFID which can be also implemented in devices that belong to IoT-like sensors.

Given the need for access, connectivity, naming and routing scheme, security, coverage IoT encompasses both M2M and Telco's legacy services.

Business context

IoT is an emerging and a very promising market. Globally the number of connected "things" (M2M+legacy) is foreseen to increase by 12 billions between 2010 and 2020 with an important increase per year (+20%) [1]. Estimation of the number of connected devices today is 1.5 billions [2]. Concerning IoO, the number of objects could reach 70 billions by 2020.

Nowadays numerous players of different kinds are involved. Mobile operators push for the use of cellular networks (2G, 3G, 4G, and future 5G) for direct connection of objects equipped with SIM cards. They also offer traffic backhauling from gateways which are reachable by objects. Fixed operators, with their footprint in the home network through boxes, in the urban area through dense wireline and wireless access (i.e. cellular, WiFi) have strong assets for M2M services. Actually, Orange is already offering M2M services: m2oCity partnership [3] (Joint Venture between Orange and Veolia), Renault deal, etc... In fact, many Telecom Operators are present in the M2M market. It is thus already a very competitive market [4] (e.g., TeliaSonera, DT, Vodafone, KPN and Telefonica in Europe).

Topology of IoT

We can identify many different market domains related to IoT: manufacturing and associated services (e.g., production, distribution, and tracking), health (e.g., in-home care, fitness, and well-being), transport, administration, insurance companies, public safety (e.g., video protection), local community, mass-market (e.g., home automation), agriculture, etc.

Regarding applications/services there is a huge number of applications across the above-mentioned domains that can be associated with IoT: metering, road safety, traffic management, tracking, monitoring... Hundreds of applications have been identified so far [1]. Nevertheless, this will likely represent quite a small part of the future applications and use-cases. Obviously, the market itself is much broader than the scope covered by operators.

Indeed, the difficulties reside in anticipating all the requirements and demands of these new applications which could have major impacts on infrastructure, business... For example, video protection, morphing, robotics, control of complex devices may have a strong impact on the network and IT infrastructure. Another challenge is the need for interaction between players evolving so far in radically different spheres such as what is found between telecommunication and energy networks in smart grid.

Operators, IoT and web of things

As seen in the introduction IoT is a major subject for operators as it impacts both their business models and their infrastructure. Another issue for operators is that web technologies tend to act completely ignoring the underlying networks.

For a new technology such as the web of things where scalability and security are going to be major issues we believe it is no longer the best strategy to act “on top of the network” and that “web of things” authors should find a way to interact with the networks they create services on.

Some potential topics are the following:

- Network requirements, impacts and potential interactions with the application layer
- Overlap between real-time communications technologies such as WebRTC and Web Real-time Back-ends with the Web of Things
- What are the needs for naming routing and addressing schemes?
- Relevance of operators in providing security/trust/privacy to the Web of Things
- Relevance of operators in providing managed carrier-grade Cloud services, similar to NFV, to the Web of Things
- What are the key partnerships between vendors, operators and application developers?

References:

- [1] Internet of Things, Outlook for the top 8 vertical markets, Samuel Ropert, Idate, September 2013
- [2] 15 milliards d’ objets connect é s et moi, é moi..., Gabriel Sim é on, http://www.liberation.fr/economie/2013/11/03/15-milliards-d-objets-connectes-et-moi-emoi_944254, Lib é ration, November 3, 2013
- [3] m2ocity, <http://www.m2ocity.com/>
- [4] Internet of things, the next wave of Internet, Fayçal Boujemaa & al, Final synthesis, September 2012