



Open Source blueprint for large  
scale self-organizing cloud  
environments for IoT applications



## *White Paper*

# SMEs and Internet of Things

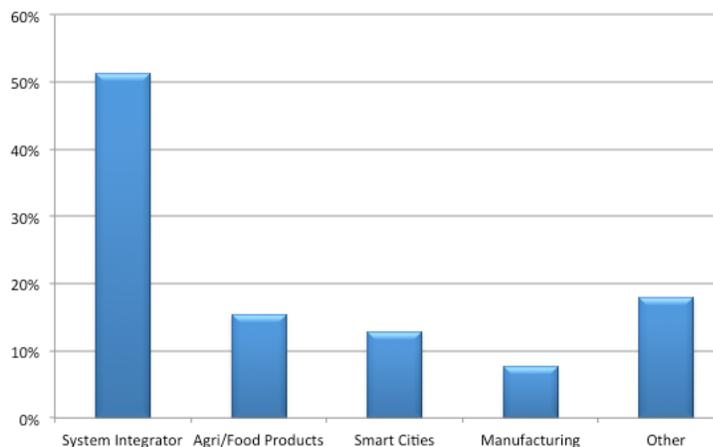
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February 2013

This white paper has been produced by the OpenIoT project as part of their requirements analysis at the start of their research project. Significant results have however been found and the aim of this document is to make these results public, since they might help other projects or other entities working in the Internet of Things domain to understand more what are the needs and situations that SMEs are facing.

### **Background & Process**

The inspiration came from the European Commission's initiative that started in 2009 to create the SME test – Think Small First<sup>1</sup> – pushed forward in the Small Business Act that was later transposed into National legislation in all Member states. This principle basically states that all laws, procedures, systems and solutions should be tested against what SMEs really want and how will this effect them.

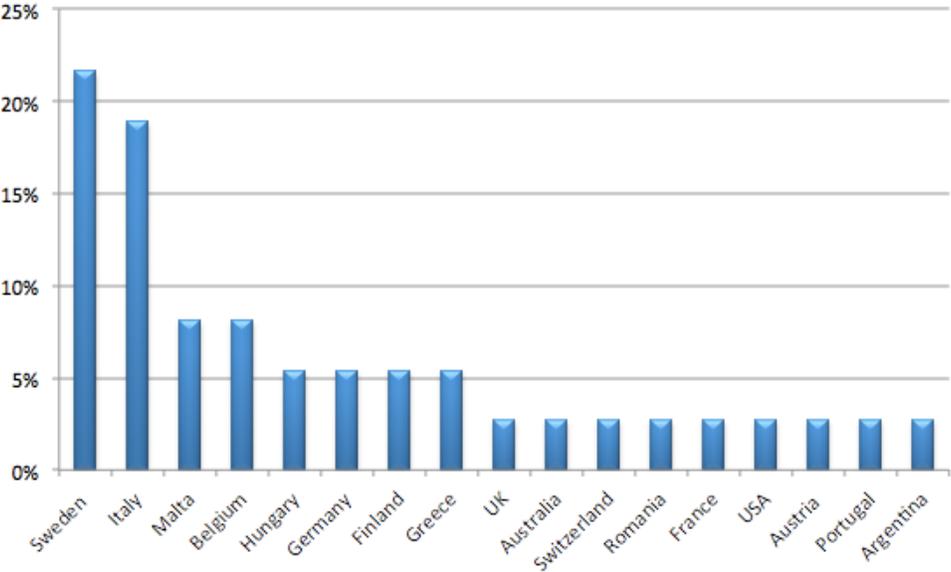
A project like OpenIoT will open up the realm of Internet of Things to be more accessible for everyone, and this definitely includes SMEs. It was therefore thought of focusing on their needs from the beginning of the project. This ensures that when the final results gets released, it would pass the SME test – making the lives of SMEs easier, saving time, and thus increasing EU competitiveness.



Two online questionnaires were designed – one was for System Integrators (SMEs that already are deeply involved in the development of monitoring, tracking, sensor based ICT solutions) and Solution Providers (SMEs that were the real users of such solutions, mostly focusing on the three application areas that are also the focus of the demonstrators of the project – Agriculture (eScience), Manufacturing, and Smart Cities).

<sup>1</sup> [http://ec.europa.eu/enterprise/policies/sme/small-business-act/think-small-first/index\\_en.htm](http://ec.europa.eu/enterprise/policies/sme/small-business-act/think-small-first/index_en.htm)

Over 200 companies from all over Europe and beyond were selected, and the questionnaires were promoted to them. Personal contacts were interviewed by phone or at company visits, resulting in a total of 40 respondents (23 System Integrators and 17 Solution Providers). The following chart shows country of origin of respondents, from 13 EU countries and 5 more countries globally.

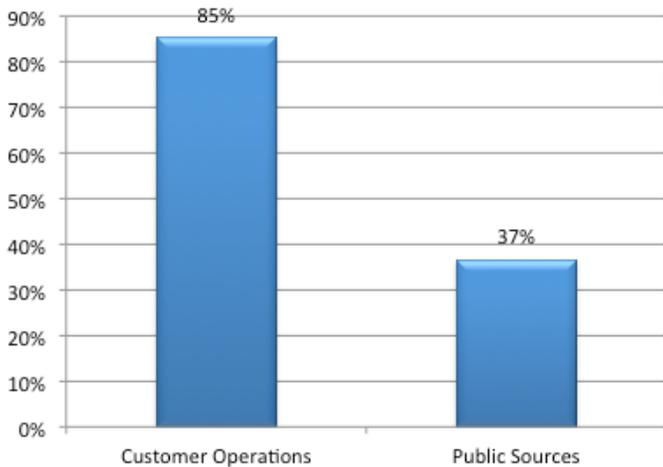


**Why Use Internet-Connected Objects?**

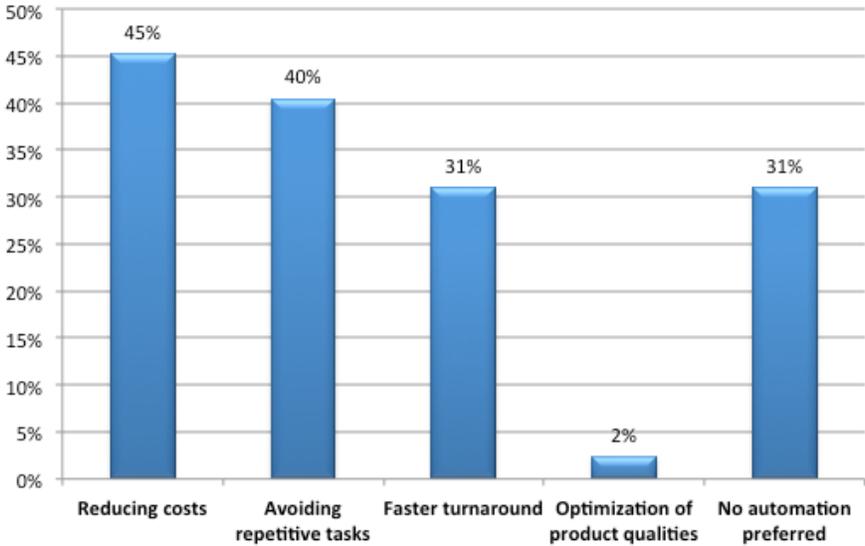
Already today, many system integrators and solutions providers use internet-connected objects. 82% of SME respondents (n=40) mentioned this. The chart below shows what are the functions they are used for - tracking & tracing, locating business assets, identifying objects and other purposes.



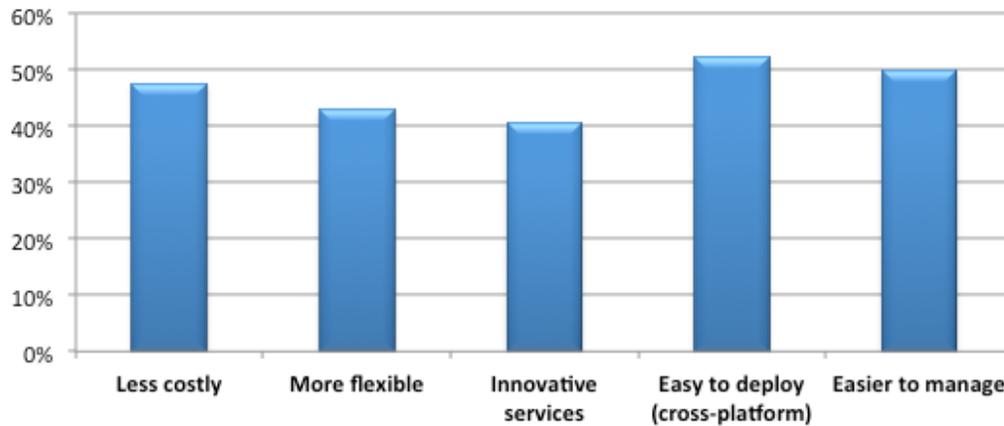
Data for these purposes come from own or customer's operations. 37% have started using Open Data.



The reasons for using internet-connected objects also varies, it is most often for cost reduction, avoiding repetitive tasks and faster turnaround. Notably, it is uncommon to use internet-connected objects for optimizing product qualities, indicating that *there is untapped innovation potential for adding value to products through associated services.*

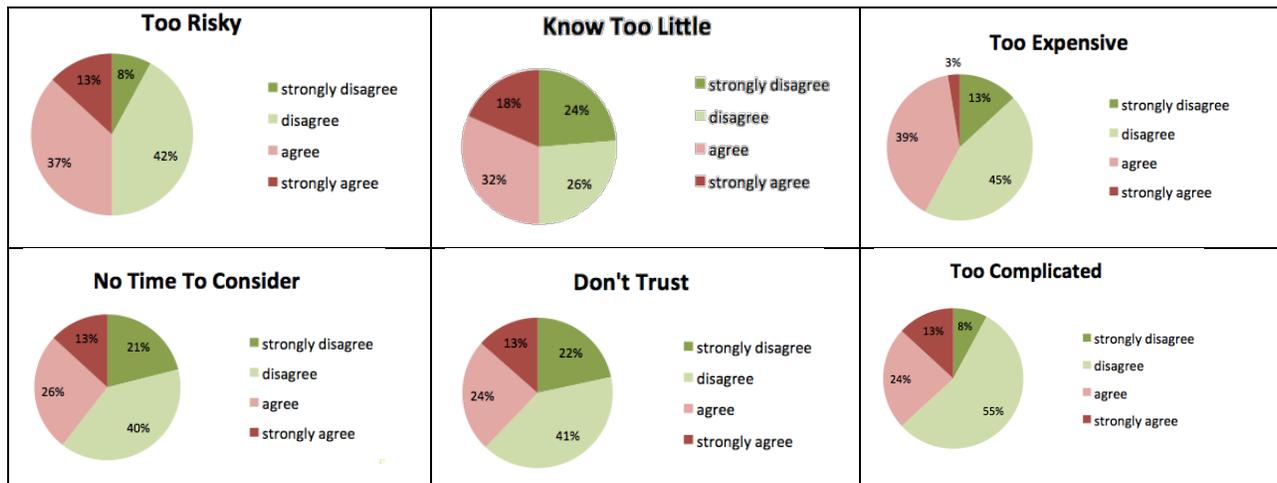


For moving towards the vision of Internet-of-Things, SMEs have a wide array of motivations – about half of them think that it will be less costly, more flexible, help with service innovation, be easier to deploy or easier to manage, than today's solutions. *This indicates that Internet-of-Things platforms need to factor all these requirements in, and be based on diverse sets of use cases to ensure generality.*



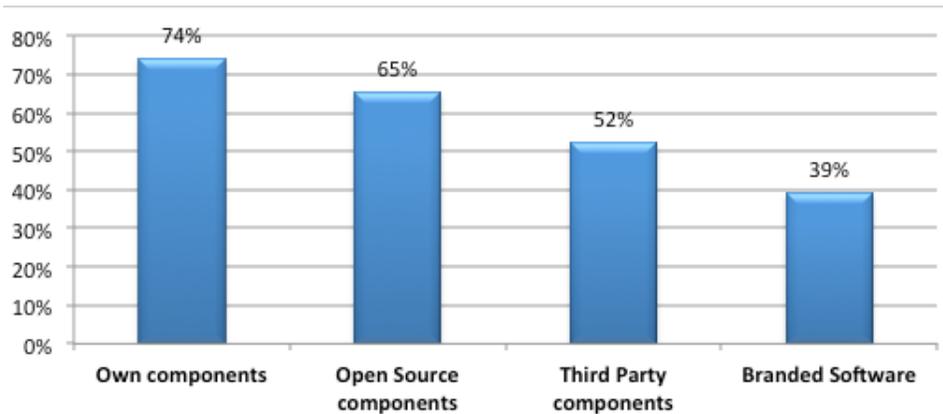
### **Barriers to Using IoT**

However, SMEs see barriers in terms of knowing too little about Internet-of-Things, perceiving it as a risky technology area to enter, and – paradoxically but not a show stopper – that IoT-based solutions might turn out to be more expensive. This indicates a failure in communicating a clear message about the Internet-of-Things vision and platform developments. *More awareness needs to be raised on what is possible, good initial business cases and other success stories need to be promoted, and platforms need to be compatible with commercial off-the-shelf and state-of-the art systems. Messages about IoT solutions must be simple to be understood by all. Ease-of-use is vital and a quicker learning curve even for programming such solutions will help adoption.*

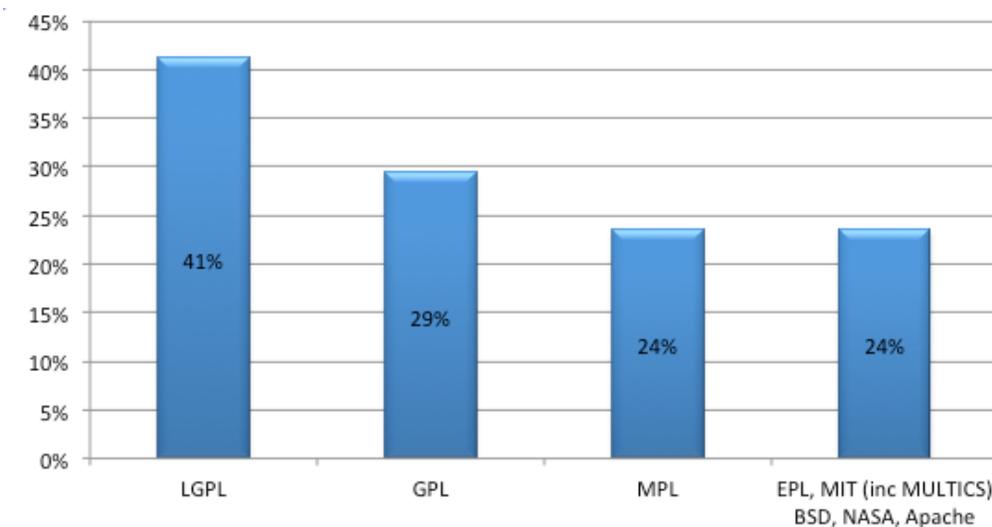


## Focus on System Integrators

Among the system integrators, using own and open source components is most common for building IoT applications, while using third-party components and branded components is less common.



For integrators using Open Source, the most common licensing model is LGPL, which allows the companies to link with open source libraries. Mozilla Public License (MPL) is also fairly popular (**24%**). There is also a wide variety of much less popular licensing models in use (**24%**). Notably, **29%** of system integrators using open source say that they integrate GPL-licensed components, which in principle would mean that also their products need to be released as open source under the GPL license. *This shows that there is a need to educate the companies about what GPL and other license models are, so that they will know when it can be used, and to avoid integrating GPL-licensed components into closed-source products.*

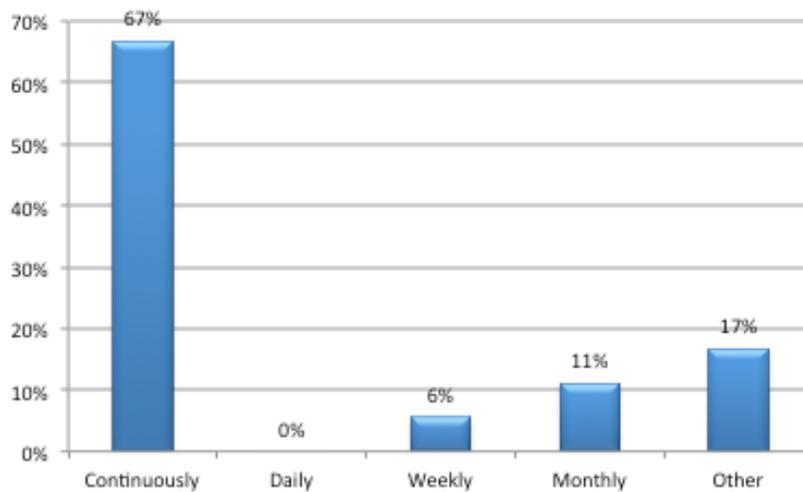


The system integrators are much less concerned with costs and technology risks, but complexity of cloud-based internet-connected objects is of some concern. **17%** strongly agree that it is a barrier knowing too little about it.

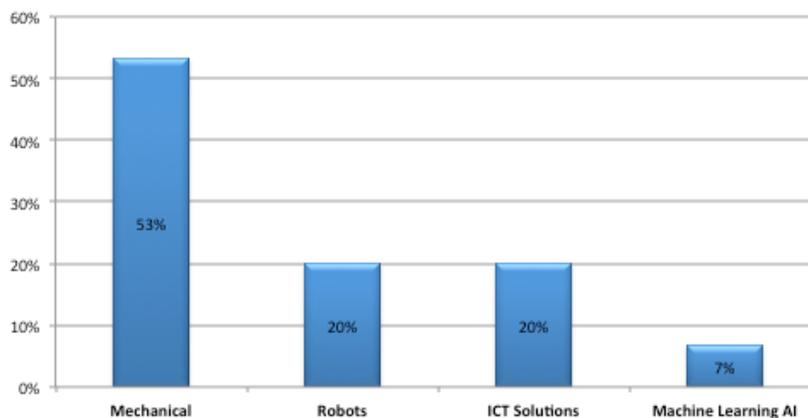
## Focus on Solution Providers

Not surprisingly, the big majority of solution providers (**67%**) rely on sensors for monitoring, but as many as **56%** of them also use humans to report data. *This indicates that there is a lot of further innovation potential in automatic sensor-based monitoring. In order to give a holistic view humans-as-sensors need to be taken into account and integrated as well within existing IoT solutions.*

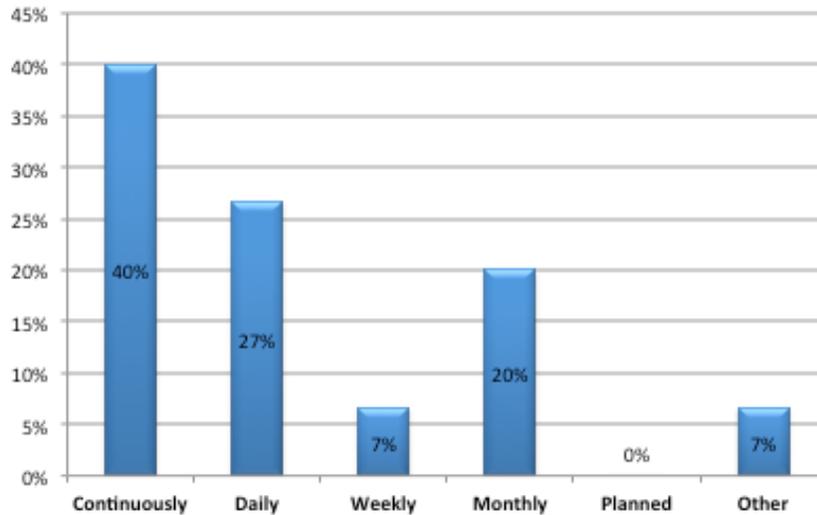
Interestingly, most monitoring solutions operate continuously, and those who don't tend to have quite infrequent readings, presumably relying on human interventions. A key conclusion is that *Internet-of-Things platforms must be made reliable as they have to be 'always on'. They should also be reactive, so that actions can be taken as soon as possible.* Periodic harvesting of sensor logs will be slow in uncovering unfavourable or even critical problems, but may also be used for thorough offline analysis of sensor data.



With respect to automation, Solution Providers use this mainly for reducing costs and getting faster turn-around, while avoiding repetitive tasks is less important. Mechanical automation is by far the most common, while automation using robots and in the ICT space is also in use.

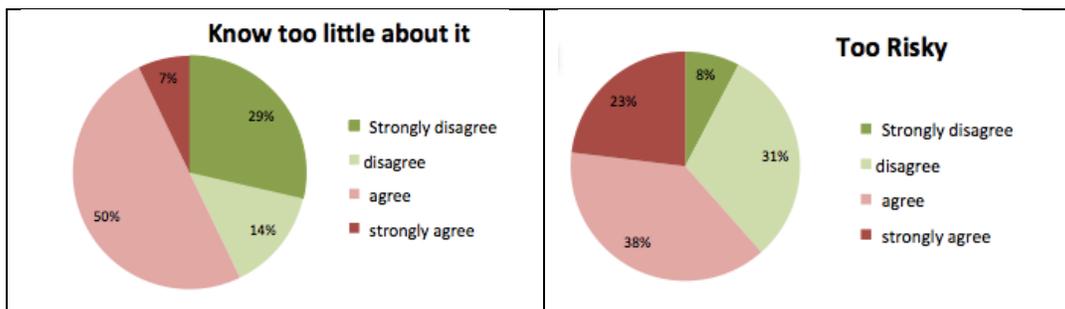


Automation has a different use pattern than monitoring; surprisingly continuous automation is not as common and many solution providers claim that automation is done on a daily, weekly or even monthly basis. *This may indicate that the issue of automation is not well understood among solution providers, but in any case further studies are recommended.*



Solution providers use a mix of branded software packages, custom-made software and own software. Notably, Open Source software is less used than by System Integrators (only **28%** compared to **65%**).

Part of the reason for this could be that among solution providers, there is a fairly common perception that Internet-connected objects are a risky technology area, and that they know too little about it. *Notably, 31% strongly agree that they do not trust cloud providers. The charts below also point towards the need for better education and communication with Solution Provider SMEs.*



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