

Digital Single Market

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The many opportunities and challenges of the Internet of Things

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On the 26th of October 2011, the Polish Presidency of the EU will host a conference on the Internet of Things at Poznań University of Technology during Future Internet Week. This is an important milestone in Europe's commitment to sustainable economic growth and better quality of life for citizens.

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On the 26th of October 2011, the [Polish Presidency of the EU](#) [1] will host a [conference on the Internet of Things](#) [2] at Poznań University of Technology during [Future Internet Week](#) [3]. This is an important milestone in Europe's commitment to sustainable economic growth and better quality of life for citizens.

I'm pleased to stress that this conference will be the fifth since 2007 in the series of **Internet of Things** events during an EU Presidency. The outcome of the conference will be determined not by whether the Internet of Things community can sit together in Poznań on 26th October, but whether its different components can work together in the months and years ahead - in other words, the commitment and convergence of decision makers from government, industry and civil society in Europe.

The conference will also underline how and why **an Internet of Things will lead to great opportunities for growth and jobs in European economy and industry**. This is essential. We are poised for progress. Three years after the beginning of the worst recession most of us have ever known, and being aware of the threats that continue to affect our economic environment, harm our capacity to remain at the cutting-edge of technology to meet the current and future challenges of technological development, and haunt the very future of Europe's welfare and competitiveness, time has come to recognize the potential of Internet-enabled communications with and among objects for a better life that we pass on to our children.

The number of devices connected to and by the Internet is expected to range between 16 and 50 billion in 2020, depending on the definition of 'device' that is retained. Fleet and freight

management, security/surveillance, transport and mobility, vending/payment terminals, smart metering and grids, industrial processes, etc. are all areas where connected devices will help to improve standards of living and provide new solutions for enabling the enterprise of tomorrow and for addressing global challenges.

At stake is whether new jobs and industries take root in Europe; whether the hard work and industry of our creators and inventors is rewarded; whether we sustain the moral leadership that has made Europe not just a location on a map, but a light to the world. This is not just poetry – I'm convinced that Europe is at a crucial crossroads in its 50-year journey, that its future is played right now, not only through the important discussions about how to solve the current debt crisis but also through the strategic decisions that will be made – or not – over the next few years regarding the Internet of Things.

Indeed, the Internet of Things raises questions around the changing roles and power relations between informed citizens, organisations and institutions built during early computer age. It enables growing groups of media and sensor literate individuals to organise themselves through the Internet and through new data gained from smart objects endowed with sensing and actuating capabilities. Realising the full potential of the Internet of Things requires that many challenges – technical, economic, legal, ethical, social – are addressed on time and properly. I will mention here only three of them:

1. A first challenge will be to **balance security and resilience** with end-user programming, convenience and innovation.
2. A second one will consist in providing a **new legal definition of privacy** in a world where communicating objects are likely to give the impression that they can substitute for humans to take decisions.
3. A third one will be to assess how far the Idea of Man influences the power relationship between humans and computer systems as well as the values that we build into these systems – that is **how to deliver ethics in the technological design of systems.**

Tackling these challenges – and others – requires the **definition of a "governance" of the Internet of Things.** This is why the conference includes a panel that will provide a forum for discussing the most recent developments regarding governance. Among these developments is the initiative of the European Commission to prepare by mid-2013 a Recommendation to the Member States on the governance of the [Internet of Things](#) [4], following an open consultation of all stakeholders and a comprehensive impact assessment.

Another panel will discuss the rise of the "Sensing Enterprise". This concept was born recently in the Future Internet Enterprise Systems Cluster that provides the instrument for creating synergy between all research and innovation projects addressing enterprise interoperability and collaboration. With massive quantities of real-time information becoming *pushed* rather than *pulled* on a global scale (e.g., tweets, sensing information, GPS data), future enterprises will become context aware, dynamically configurable, and multi-identity oriented virtual entities that manifest themselves in many different ways and re-invent themselves over and over again.

The combination of social media providing real-time global awareness and sensor-based information published to the enterprise is likely to bring tremendous business opportunities while at the same time posing unprecedented challenges to the traditional

enterprise. The control in the development of future enterprise systems will progressively move from IT specialists to business experts. Enterprise software applications available online will be "immersed" in the enterprise system's entities and built into their (multiple) identities.

For the first time ever, this new paradigm of intelligent sensing virtuality in the business and organisational strategy of (future) enterprises will be debated.

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