



IOT6

Universal Integration of the Internet of Things through an IPv6-based Service Oriented Architecture enabling heterogeneous components interoperability

Through the IoT6 project, the University of Luxembourg has benefited from European research funding.

Smart living with IoT6

1 The Internet has revolutionised our society over the past few decades by offering a computer-based communications platform with enormous potential. The next step will be the “Internet of Things”, which will enable communication between virtually any kinds of objects that can be provided with unique identifiers and transfer data over a network. The FP7 project IoT6 aimed to exploit the potential of the new Internet protocol IPv6 for overcoming the current shortcomings and fragmentation of the Internet of Things.

IPv6 is the latest version of the Internet protocol (IP) that provides an identification and localisation system for computers across the Internet. IPv6 will exponentially increase the number of IP addresses that can be provided compared to its predecessor, IPv4. This is an important advantage for the future Internet of Things, which will extend the Internet to an enormous amount of devices other than computers. IPv6 also offers other advantages for the Internet of Things, including better security features and solutions that support the mobility of end nodes.

Exploring IPv6 potential

The IoT6 project brought together a consortium of innovative companies, research and academic institutions, end-user centric service providers and business experts from seven European countries – Austria, France, Luxembourg, Serbia, Spain, Switzerland and the United Kingdom – and Korea to research the potential of IPv6 and related standards to support the future Internet of Things. An international team at the University of Luxembourg’s Interdisciplinary Centre for Security, Reliability and Trust (SnT), headed by Professor Dr Thomas Engel, contributed with its expertise in security and privacy handling in distributed environments.

The SnT team was confronted with the main challenges and objectives of IoT6, which were to research, design and develop a highly scalable and secure IPv6-based service-oriented architecture to achieve interoperability, mobility, cloud computing integration and intelligence distribution among heterogeneous smart things components, applications and services. The project notably explored multi-protocol interoperability with and among heterogeneous devices, device mobility and mobile phone networks integration to provide ubiquitous access and seamless communication, and cloud computing integration with Software as a Service (SaaS).

Large-scale security monitoring

The NetLab team of the SnT worked in particular on security aspects of the Internet of Things. The team's contribution to the project involved large-scale monitoring to detect abnormal events in an IoT6 deployment, such as rogue devices or conducted attacks from internet to Internet of Things devices, a review of cryptographic solutions for small things which are limited by their computational and energy resources, and the design of an alternative stack for the Internet of Things based on information-centric networking including the necessary security functions. The team also performed an evaluation of smart routing (content-based forwarding) through multiple technologies including software defined networking.

After three years of research, the IoT6 project provided recommendations on the exploitation of IPv6 features for the Internet of Things. Another successful result was the hardware and software design and realisation of an IoT6 gateway called SmartBoard.

In addition, the project also produced an SME handbook, a user-guide aiming to assist SMEs in setting up IoT6-like infrastructures in order to create new businesses. In addition, IoT6 contributed to over 40 scientific publications. The participation in IoT6 provided the University of Luxembourg with the opportunity to establish cooperations that set the scene for further innovative and promising EU projects.



The Seventh European Framework Programme for Research and Technological Development (FP7) was the European Union's main financial instrument to support European Research during the 2007-2013 period. The funding programme will continue under Horizon 2020, the Framework Programme for Research and Innovation, supporting a wide range of research domains with a budget of €79 billion (2014-2020).ⁱ

