



IoT6 - UNIVERSAL INTEGRATION OF THE INTERNET OF THINGS THROUGH AN IPV6-BASED SERVICE ORIENTED ARCHITECTURE ENABLING HETEROGENEOUS COMPONENTS INTEROPERABILITY

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Abstract

This deliverable is a public description of the IoT6 project in terms of main objectives, technical approach, key issues and expected impact. It is intended for use in publications of the European Commission and the project.

Dissemination Level

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| <input checked="" type="checkbox"/> | PU: Public |
| <input type="checkbox"/> | PP: Restricted to other programme participants (including the Commission) |
| <input type="checkbox"/> | RE: Restricted to a group specified by the consortium (including the Commission) |
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IoT6 - Universal Integration of the Internet of Things through an IPv6-based Service Oriented Architecture enabling heterogeneous components interoperability

Main Objectives

The IoT6 project aims to exploit the potential of IPv6 and related standards (6LoWPAN, CORE, COAP, etc.) to overcome current shortcomings and fragmentation of the Internet of Things, in line with the IERC – Internet of Things European Research Cluster - and EC recommendations.

IoT6

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



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Its main challenges and objectives are to research, design and develop a highly scalable IPv6-based Service-Oriented Architecture to achieve interoperability, mobility, cloud computing integration and intelligence distribution among heterogeneous smart things components, applications and services. Its potential will be researched by exploring innovative forms of interactions such as:

- Information and intelligence distribution.
- Multi-protocol interoperability with and among heterogeneous devices.
- Device mobility and mobile phone networks integration, to provide ubiquitous access and seamless communication.
- Cloud computing integration with Software as a Service (SaaS).
- IPv6 and STID Information Service (STIS) innovative interactions.

The main outcomes of IoT6 will be recommendations on how to exploit IPv6 features for the Internet of Things and an open and well-defined IPv6-based Service Oriented Architecture enabling interoperability, mobility, cloud computing and intelligence distribution among heterogeneous smart components, applications and services - including with business processes management tools and smart buildings. It will also include an end-user perspective by addressing the requirements of a green and smart IPv6 building project lead by Mandat International.

To achieve these ambitious goals, the consortium consists of seven international academic or research partners and two industrial partners that bring in expertise from complementary research areas such as IPv6, multi-protocol interoperability, routing protocols, security, SOAs, sensor networks, building automation, mobile phone networks, cloud computing, business processes and STIS/RFID. IoT6 is supported by a large industry support group with renowned members, which will act as general advisors and will support the dissemination, exploitation and standardization activities.

Technical Approach

IoT6 will explore the potential of IPv6 to support the development of the Internet of Things through a highly scalable open service-oriented architecture, enabling the integration and interoperability of heterogeneous communicating things, with intelligence distribution, mobile network integration, business processes and cloud computing integration.

IoT6 will support the integration of an exponentially growing and still very fragmented Internet of Things. It will research the potential of IPv6 (and related emerging protocols) to enable a global integration of the Internet of Things with applications and services in the cloud. The evolution towards IPv6 is considered as ineluctable¹ and constitutes both a challenge and an opportunity. IoT6 will contribute to the standardization process and will support the transition towards IPv6, as encouraged by the EC Communication on IPv6², the OECD (Organisation for Economic Co-operation and Development) Seoul Declaration on the Future of the Internet³, the EC Communication on the Internet of Things⁴ and the European cluster IERC vision for realizing the Internet of Things⁵. IoT6 is also an opportunity to develop cooperation links with South Korea, which is a leading country on research related to IPv6 and the Internet of Things, and with the United States of America, through Professor Vint Cerf.

Key Issues

IoT6 will **explore the potential of IPv6 to serve as an integrator for the future Internet of Things, through an innovative service-oriented architecture enabling multiple forms of integration**. It takes the "Internet of Things" in its larger sense: a network of communicating "things". It anticipates the current evolution towards more interconnected, pervasive and

¹ "Vision and Challenges for realising the Internet of Things" EIRC http://www.internet-of-things-research.eu/pdf/IoT_Clusterbook_March_2010.pdf

² COM/2008/0313 final – Advancing the Internet : action plan for the deployment of IPv6 in Europe

³ Adopted by the OECD Ministerial Meeting on the Future of the Internet Economy, Seoul Korea, 18 June 2008

⁴ COM/2009/278 final – Internet of Things : An action plan for Europe, pages 7 and 8

⁵ Report of March 2010: <http://cordis.europa.eu/fp7/ict/enet/documents/iot-cluster/iot-clusterbook2009.pdf>

ubiquitous ICT environments, enabling almost anything to be interconnected through the Internet. In this context, "scalability, modularity, extensibility and interoperability among heterogeneous things and their environment are key design requirements for the Internet of Things."⁶ IoT6 will contribute to exploring and paving the way to a network-of-networks architecture, enabling billions of heterogeneous smart things and devices to be interconnected, to communicate and to work together.

Expected Impact

IoT6 will pave the way to a new range of Internet enabled services and their integration with enterprise business processes by enabling integration of cloud computing, heterogeneous devices, mobile phones networks and STIS. IoT6 will define an open architecture leveraging the capacity of IPv6 to provide ubiquitous access and seamless communication among a large population of mobile and networked smart objects located in diverse geographical locations thus enabling a cost effective **integration and interoperability of heterogeneous smart things** and systems.

IoT6 will develop an **open service-oriented architecture** easing the integration of different products and services through the Internet. It will **interconnect the Internet of Things with the Internet of Services** through IPv6.

IoT6 results will contribute to the **International Cooperation House** project coordinated by Mandat International for delegates and experts coming from developing countries to attend UN conferences.

IoT6 will provide a **handbook and a workshop** targeting SMEs to support their exploitation of IoT6 outputs as well as transition to IPv6.

IoT6 is closely linked with major industries, international forums, standardization bodies and other research projects with a European and international perspective. IoT6 is in good position to align and contribute to the consensus by industry and other stakeholders on the need and possible use of IPv6 for the Internet of Things, with a proposed open and decentralized service oriented architecture.

⁶ Internet of Things, Strategic Research Roadmap, September 15 2009, page 22