Interoperability of Heterogeneous IoT Platforms

Results in Brief

Innovative framework, tools and components to allow interoperability with any IoT platform

Despite the proliferation of Internet of things (IoT) platforms, there's a lack of interoperability and related standards and tools. An EU initiative has delivered a framework and associated tools to create interoperable IoT platforms.

DIGITAL ECONOMY

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The results of an IoT-European Platforms Initiative analysis show that there are over 300 different IoT platforms in the market, with varying degrees of maturity and openness. "Every IoT platform developer considers their own platform as the cornerstone of interoperability," says Prof. Carlos Palau, coordinator of the EU-funded INTER-IoT ⬈ project. "In other words, if there are several platforms developed in an area or they have to interact with certain applications, they must connect to the developer's platform." This creates a preference for one platform over another that often isn't accepted by other platform owners.

An interoperable and open IoT framework

INTER-IoT was based on three main building blocks: methods and tools to provide interoperability among and across each layer of IoT platforms; a global framework for programming and managing interoperable IoT platforms; and an engineering methodology. The INTER-IoT team developed a suite of software tools and artefacts

to provide open interoperability.

By delivering a superior product and experience, these solutions enable vendors and developers to interact and interoperate without interfering with someone's ability to compete. In the absence of global IoT standards, the project "supports and makes it easy for any company to design IoT devices, smart objects or services and bring them to the market quickly, as well as to create new IoT interoperable ecosystems," he adds.

INTER-IoT provides support for using data from different platforms in a single application in an integrated way and with the same semantics. This was done without showing preference over any IoT platform.

Project partners designed and implemented an open cross-layer framework, an associated methodology and tools to enable voluntary interoperability among heterogeneous IoT platforms. The proposed approach will lead to effective and efficient development of adaptive, smart IoT applications and services over different IoT platforms. This multi-layered approach integrates different IoT devices, networks, platforms, services and applications, resulting in a global continuum of data, infrastructures and services enabling different IoT scenarios.

Creating an interoperability ecosystem linked to IoT

INTER-IoT acts as a layered intermediary between different IoT platforms with various support tools. It isn't a new IoT platform, but rather acts as a go-between for diverse platforms. "INTER-IoT is impartial to all IoT platforms, they're on the same level," notes Prof. Palau.

The consortium tested and validated the solutions in two application domains: transportation and logistics in sea ports, and mobile health for chronic disease monitoring. Some of the interoperability components are seen as exploitable products and currently being commercialised. Virtual GW enables interoperability at the device layer and connection to the cloud with an extension to virtual networks, software-defined networking and use in 5G networks. INTER-MW enables interoperability at the middleware layer. IPSM provides semantic mediation between different platforms, and can be extended to other platforms besides IoT.

INTER-IoT devised business models for commercialising and exploiting project components based on an open-source strategy. It also developed tools for the configuration and management of interoperability, including security and privacy.

"Thanks to INTER-IoT, interoperability can be achieved in a guided, seamless way between different IoT components like devices or platforms," concludes Prof. Palau.

"The interoperable and open IoT framework solution provides a flexible and scalable solution for stakeholders, system integrators and research organisations."

Keywords

INTER-IoT   IoT   interoperability   IoT platforms   developer

interoperable IoT platforms

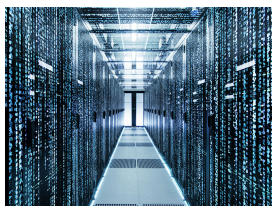## Discover other articles in the same domain of application

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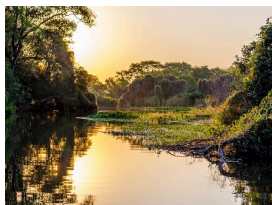Putting Europe at the forefront of the supercomputing revolution

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Project Information

INTER-IoT

Grant agreement ID: 687283

[Project website ↗](#)

DOI
[10.3030/687283 ↗](#)
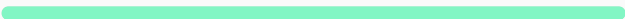
Project closed

EC signature date
26 October 2015

Start date
1 January 2016

End date
31 December 2018

Funded under
INDUSTRIAL LEADERSHIP - Leadership in enabling and industrial technologies - Information and Communication Technologies (ICT)

Total cost
€ 7 329 850,00

EU contribution
€ 7 329 850,00

Coordinated by
UNIVERSITAT POLITECNICA DE VALENCIA
🇪🇸 Spain

Last update: 13 September 2019

Permalink: https://cordis.europa.eu/article/id/386902-innovative-framework-tools-and-components-to-allow-interoperability-with-any-iot-platform

European Union, 2025