

PROJECT

BUTLER

uBiquitous, secUre inTernet-of-things with Location and contExt-awaReness

Funding: European (7th RTD Framework Programme)

Duration: Oct 2011 - Oct 2014

Status: Complete with results

Total project cost: €14,427,006

EU contribution: €9,708,000



[CORDIS RCN : 101349](#)

Background & policy context:

Recent ICT advances are bringing to reality a world where sensors, actuators and smart portable devices are interconnected into an Internet-of-Things (IoT) ecosystem reaching 50 Billion devices by 2015. The IoT major challenges are, from a systemic viewpoint, smart resource management and digital security; and from a user/service perspective, the pervasiveness (uniformity of performance anytime and anywhere) and awareness (inversely proportional to the degree of knowledge required from users).

Objectives:

BUTLER will be the first European project to emphasise pervasiveness, context-awareness and security for IoT. Through a consortium of leading Industrial, Corporate R&D and Academic partners with extensive and complementary know-how, BUTLER will integrate current and develop new technologies to form a "bundle" of applications, platform features and services that will bring IoT to life. For this purpose, BUTLER will focus on:

- Improving/creating enabling technologies to implement a well-defined vision of secure, pervasive and context-aware IoT, where links are inherently secure (from PHY to APP layers) applications cut across different scenarios (Home, Office, Transportation, Health, etc.), and the network reactions to users are adjusted to their needs (learned and monitored in real time).
- Integrating/developing a new flexible, smart-device-centric network architecture where platforms (devices) function according to three well-defined categories: smart object (sensors, actuators, gateways), smart mobile (user's personal device) and smart servers (providers of contents and services), interconnected over IPv6.
- Building a series of field trials, which progressively integrate and enhance state-of-the-art technologies to showcase BUTLER's secure, pervasive and context-aware vision of IoT. In addition to these R&D innovations, BUTLER and its External Members Group will also aggregate and lead the European effort in the standardisation and exploitation of IoT technologies.

Parent Programmes:

[FP7-ICT - Information and Communication Technologies](#)

Institute type: Public institution

Institute name: European Commission

Funding type: Public (EU)

Partners:

- KATHOLIEKE UNIVERSITEIT LEUVEN, Belgium
- Swisscom (Schweiz) AG, Switzerland
- FACHHOCHSCHULE ZENTRALSCHWEIZ - HOCHSCHULE LUZERN, Switzerland
- ZIGPOS GmbH, Germany
- JACOBS UNIVERSITY BREMEN GGMBH, Germany
- AYUNTAMIENTO DE SANTANDER, Spain
- FUNDACION TECNALIA RESEARCH & INNOVATION, Spain

- BANCO SANTANDER SA, Spain
- TECNOLOGIAS SERVICIOS TELEMATICOS Y SISTEMAS S.A., Spain
- ERICSSON ESPANA SA, Spain
- OULUN YLIOPISTO, Finland
- CASCARD OY, Finland
- MAYA TECHNOLOGIES SAS, France
- ALCATEL - LUCENT BELL LABS FRANCE, France
- COMMISSARIAT A L ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES, France
- GEMALTO SA, France
- POLARIUS - UTREMA, France
- ISTITUTO SUPERIORE MARIO BOELLA SULLE TECNOLOGIE DELL'INFORMAZIONE E DELLE TELECOMUNICAZIONI, Italy
- STMICROELECTRONICS SRL, Italy
- TELECOM ITALIA S.p.A, Italy
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Technologies:

Infrastructure management
Multimodal border management technologies

Development phase: Research/Invention

Key Results:

End-users are intended to access context-aware BUTLER applications by means of mobile terminal (smartphones, tablets and the like). BUTLER SmartMobile is the framework that allows, on the one hand, BUTLER application developers to make their apps available to end-users and, on the other, end users to browse, install and use available BUTLER applications.

As mobile terminals are the main target of the BUTLER SmartMobile framework, we use the widely used term 'app' to name BUTLER applications. The BUTLER SmartMobile framework targets mobile platforms and thus, the following terminal and technologies are supported:

- HTML5 mobile web browsers;
- Android devices;
- iOS devices (at the time of writing, this version is not yet available, Android being the main OS targeted);

In order to access BUTLER applications, end-users download a single BUTLER SmartMobile 'app' (the BUTLER SmartMobile framework) on their terminal. This generic app will give access to the actual BUTLER applications. The BUTLER SmartMobile framework provides:

- A mechanism to develop, deploy and deliver BUTLER end-user applications: e.g. a set of tools have been developed and made available to BUTLER application developers for them to easily build applications on top of the BUTLER SmartMobile framework. It provides a skeleton application that can be used as a template, an app launcher that is useful when external applications need to be started, and a repository and related scripts to securely deploy applications.
- The means to deploy apps that can be used either as native (more precisely hybrid through PhoneGap) or as mobile web apps. As previously explained, application can be available from the BUTLER SmartMobile 'app' downloaded to the end-user terminal or through a web browser.
- A responsive HTML5 UI framework: such a UI framework allows any application built on top of it to be made available on various types of mobile devices, e.g. desktop, phones, tablets, TVs, etc.
- A client-side BUTLER library (BUTLER.js). This JavaScript library provides a set of core features required to develop BUTLER applications on the end-user terminals, such as the authentication. While those features are not provided by BUTLER SmartMobile, the BUTLER.js library wraps external libraries in order to provide a set of consistent API to developers. This library provides as

well methods to access low-level components on the mobile device in a common way (e.g. same method calls on any targeted mobile platform).

- A backend service acting as the BUTLER Applications Repository: this service is the central place where developed applications are deployed. Indeed, it allows developers to deploy and publish their apps. Then, this service makes applications available either to BUTLER SmartMobile clients or web browsers. Finally, it provides a set of API used by the developers' tools to deploy apps and by BUTLER SmartMobile clients to get the lists of available applications (e.g. applications that have been developed and published).

However, it is worth noting that the BUTLER SmartMobile framework does not provide server-side apps features (e.g. no hosting facilities for server-side scripting)

Documents:

 [Deliverable 1.2 - Refined Proof of Concept and Field Trial Specification.pdf](#)

Smart mobility and services, Other

STRIA Roadmaps: specified

Transport mode: Multimodal transport

Transport sectors: Passenger transport, Freight transport

Transport policies: Safety/Security, Digitalisation

Geo-spatial type: Other