Project Information

DISTINGO

Project ID: C2018/2-4

Start Date: 1 December 2019

Closure date: 31 March 2023

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Project Websites

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RECONFIGURABLE SMART LOCKERS— DISTributeurs INtelliGents recoOnfigurables

For years now, distribution and logistics networks have used smart lockers purely as end-points for final product delivery, and these lockers are smart computing devices with plenty of potential for improvements. **DISTINGO** intends to use smart lockers in an intelligent, reconfigurable and flexible way to empower new business models and applications, from the B2C deliveries to B2B logistics and C2C transactions, and get the maximum out of these elements by using IoT concepts, artificial intelligence and blockchain.

Main focus

Currently smart lockers are not so smart (on a technical and design term) and safe (physically and systematically) enough to operate new business services for their current and future customers. **DISTINGO** relies on European market actors and technology and service suppliers which allow building a product and services satisfying new market needs by integrating the existing and adding value created in the project.

The key expected outcomes are:

- A multi user-interface designed for best User Experience

- Locations' enhancement: Indoor & outdoor connectivity & innovative network Fog Computing solutions systems to allow a wider range of possible locations.

- A security clearance: Security assurance is a key enabler and the capability to automatically trace and allow audit of all transactions/faults/interactions is imperative.

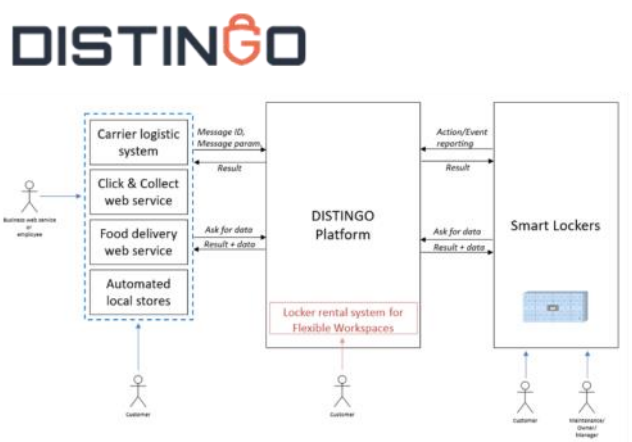
- Capability to evolve through time: New sets of services must be able to be deployed on demand, according to users' needs, and context, through time. Services have to be context specific, and profit from the whole infrastructure to be deployed thanks to Fog Computing.

- Enhanced Automation: Daily maintenance routines and provide a new way of evolution of the fleet, on the hardware and software sides.

- New markets: New customers, new interactions and de facto, new markets. From former B2B and B2B2C markets, towards C2C (collaborative economy) and new C2C2B (using customer data to anticipate the needs and business).

Approach

DISTINGO starts from cutting edge technologies and IoT strategies to build our novel smart locker solutions. We start by providing a comprehensive, machine-oriented definition of the different services provided for each one of the service typologies in the market (B2B, C2C, C2C2B). This abstract definition enables us to reconfigure the hardware to accommodate changing needs and have a single locker



fulfil different roles to accommodate a fluid environment in terms of capacity and demand.

On top of that service definition, user interfaces are generated for the different actors (e.g., end-customers but also logistics operators, riders and others) and the smart locker executes the service leveraging on cutting edge IoT features: computer vision both for the contents and the surrounding of the cabinet, sensors to ensure the safety of the premises as well as communications to interact with the complete smart locker fleet of the operator. On top of that, extensive data capture and analysis is performed to optimize the system in future runs.

Main results

Lockers will be equipped with a full set of systems, vertically segmented into 3 Activity Domains:

-A/ Sensors & automation: presence, cooling, lighting, etc.

-B/ Information & Communication: local area networks, indoor wireless, network operation, etc.

-C/ Security & safety: anti-intrusion video-surveillance, content legality check, network access control, etc.

DISTINGO fosters innovation between all 4 Activity Domains:

-Smart Sensors, effectors and devices: Provide innovative sets of sensors to offer on-demand new B2B, B2B2C, C2C and C2C2B services. Work on shared sensors and dedicated infrastructure devices (such as HW neural networks) to reduce construction cost, hardware management.

-Smart Object Recognition and Semantics: Object recognition using advanced sensor fusion and semantization to feed back-end platforms.

-Smart Lockers Services Management Systems: Dynamic deployment of new technical and user-services through Fog Computing Infrastructure to use the maximum capability of hardware (processing, storage and communication), and reduce single point of failures.

-Smart Security Management Systems: Blockchain-based secure marketplace and auditable transaction platform.

Impact

The major result expected from the project is the development of a new generation of products, fully interoperable, with added value for the end user, but also for every actor participating in the parcel delivery, from merchant (e-commerce & local) to the delivery man. Such a solution will lead to an ecosystem that will enhance the creation of new services in urban environments.

- The project will enable the product to take in charge new products such as food or valuable objects with increased security and full traceability.

- Prototypes will be presented, and experimentation in real situations will be made all along the development for the validation of new concepts.

- The project can end up with several patents in the domain of parcel box systems, data management, and other domains.

The project will also result in impactful results in specific technologies:

- Novel image recognition subsystems to identify items left in the lockers (e.g., different kinds of food) based on scalable techniques with edge-cloud balancing. This will be prototyped on x86 architectures and then demonstrated as well in ARM and heterogeneous GPU based systems. The technology will initially be based on current state of the art (TensorFlow, Torch and based on training resources such as COCO).

- To add support to CoAP (Constrained Application Protocol) over DTLS to have a secure and reliable way to exchange data-information in IoT domains over our real-time communication framework, that will open new possibilities to use it in different verticals using IoTs that were out of our scope until this moment.

About Celtic-Plus

Celtic-Plus is an industry-driven European research initiative to define, perform and finance through public and private funding common research projects in the area of telecommunications, new media, future Internet, and applications & services focusing on a new „Smart Connected World“ paradigm. Celtic-Plus is a EUREKA ICT cluster and belongs to the intergovernmental EUREKA network. Celtic-Plus is open to any type of company covering the Celtic-Plus research areas, large industry as well as small companies or universities and research organisations. Even companies outside the EUREKA countries may get some possibilities to join a Celtic-Plus project under certain conditions.

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