

A new flexible ICT platform for circular economy business models

In the framework of the CIRC4Life project, an ICT platform was created to support new circular economy business models (CEBM) and the Eco-account system which were developed within the project. The platform supports the models across the value chain by serving stakeholders along their purchasing and recycling behaviors. The ICT platform collects necessary information and offers tools facilitating the following CEBM's actions: sustainable consumption, collaborative recycling and reuse, traceability of product's sustainability along the value chain and actor's cooperation in terms of circular economy.

In the design of the ICT platform, it was crucial to consider that the circular business models are newly developed prototypes and consequently have not yet been tested in the market. This essentially means, that the system should be easily adaptable to frequently changing user requirements. The applicable methodology, the architecture of the ICT platform and its main components are described here.

To assure the flexibility and compliance of the ICT platform with the changing end user requirements, it was chosen to design and develop, an ecosystem of subsystems with different layers being served by a central platform of Service Oriented Architecture (SoA) system. Such solution provides the necessary elasticity for iterative systems and changing business models.

Figure 1 illustrates the iterative nature of the system design. Determining end-user requirements is followed by system requirements definition, which in turn, leads to the CIRC4Life ICT architecture design and development. This approach ensures, that the structure of the system architecture is in compliance with end-user requirements and needs.

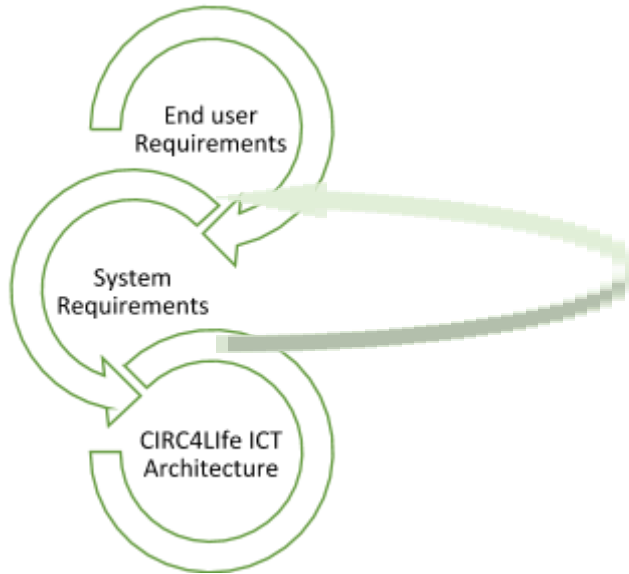


Figure 1. Iterative ICT Design

The overall SoA architecture of the ICT platform is presented in Figure 2. It consists of the core platform of the system, data providers to the system including Escrow Database of Products and any other legacy data that could be potentially needed, three independent modules (each for one CEBM) and four different end users' environments.

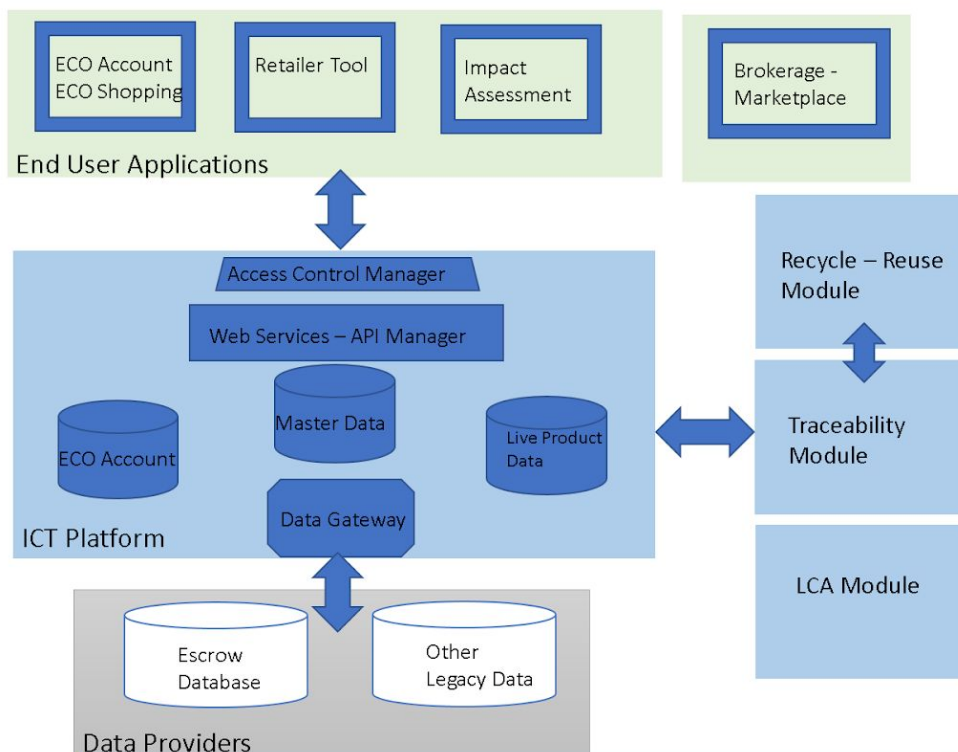


Figure 2. Overview of the ICT Platform design

The core platform of the system includes all the databases, in a harmonized data format, the website/API manager for service provision and the Access Control manager to ensure security of the whole system. As a core system backend, it handles all the data needed for

the eco-Point computation (product purchasing), eco-Credit computation (product recycling), the user transaction history, as well as a SoA that handles all the services needed by the frontend systems.

Data providers consist of database and entry systems that handle interaction with external systems and data entry containing product data together with supporting resources describing the product. They are used as an intermediate data input interface to the core platform.

Each CEBM is handled by an independent module with business logic. The “Recycle/Reuse Module” serves also for the recycling bins which will be placed to collect tablets or other electronic devices. This module is used to capture and store online recycling and reuse data of EoL products such as tablets, lighting and meat products, and then to reward users for their reuse or recycling activities (bringing the devices to the recycling containers).

In the “Traceability Module” the capturing interfaces are used to gather data from the partners and load it into the module. Access applications are developed to transform the data and provide APIs to the platform through which it can be used. Traceability data is used to monitor individual products throughout their lifecycle. The “LCA Module” is a tool that provides the functions to conduct online Life Cycle Assessment (LCA). LCA is performed to analyze the product’s environmental/social impacts through their lifecycle, in order to calculate their impact in a standardized format of Eco-points (a rewarding system to encourage users to have a more sustainable behavior when buying or recycling products).

There are four end users’ environments that provide all the interfaces needed by the system user. End User Toolbox (consisting of Consumer Eco-Account and Eco-Shopping Module) through which the customer can follow the eco-information linked to his purchasing and recycling activities. The second end user environment i.e. Retailer Tool for Eco-Accounting allows the consumer to obtain the eco-point information together with the payment information on the same receipt at the check-out point.

The Impact Assessment Tool, the third of the end user’s environments, is a system that contributes to the design of new products by displaying the impact of various materials and possibly also providing information about reuse or recycling of those materials.

Last but not least, the Stakeholders Interaction Tool in the form of a Brokerage System and a Marketplace enables the companies willing to close their loop to find the right circular economy business partners.

Service Oriented Architecture has proven to serve well circular economy business models. It offers enough flexibility to adapt to the iterative changes of the end user requirements. For the same reason, it was confirmed that the use of modular systems is of benefit for CEBM’s ICT platform. Such approach can easily deal with large variety of data, that is advantageous in case of circular business models that involve interactions between different stakeholders along the values chain.

For more information can be found on the dedicated poster to be found here:

www.circ4life.eu