
Report on creation of demonstrator specifications

Revision List

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1 INTRODUCTION

The present document describes the specifications of the EcoLogistics demonstrator.

It is organized as following:

- Chapter 2: EcoLogistics requirements
 - This chapter is a reminder or EcoLogistics main objective
- Chapter 3: EcoLogistics demonstrator
 - This chapter explains demonstrator requirement, functional and software architecture and technical design
- Chapter 4: Physical architecture
 - This chapter is describes physical architecture of the demonstrator
- Chapter 5: External usability and access
 - This chapter explains how to use or access to the demonstrator

2 ECOLOGISTICS REQUIREMENTS

The main goal of EcoLogistics is to support and promote the use of standardized tools along the supply chain.

These tools could bring a better traceability, providing several key improvements in various domains:

- Security of consummators: rapidity (“real time”), efficiency, quality.
- Sustainability: route optimization, stock and replenishment optimization.

To consolidate our approach, GS1 organization joins EcoLogistics partnership and EcoLogistics chooses to base its demonstration tools on GS1 standards.

So, EcoLogistics uses:

- Electronic Product Code to identify assets
- Electronic Product Code Information System to manage EPC events
- Create an Electronic Product Code Network to connect every EPCIS (GS1 ONS EPCIS exchange is not available for now)

The following figure represents the GS1 final architecture target.

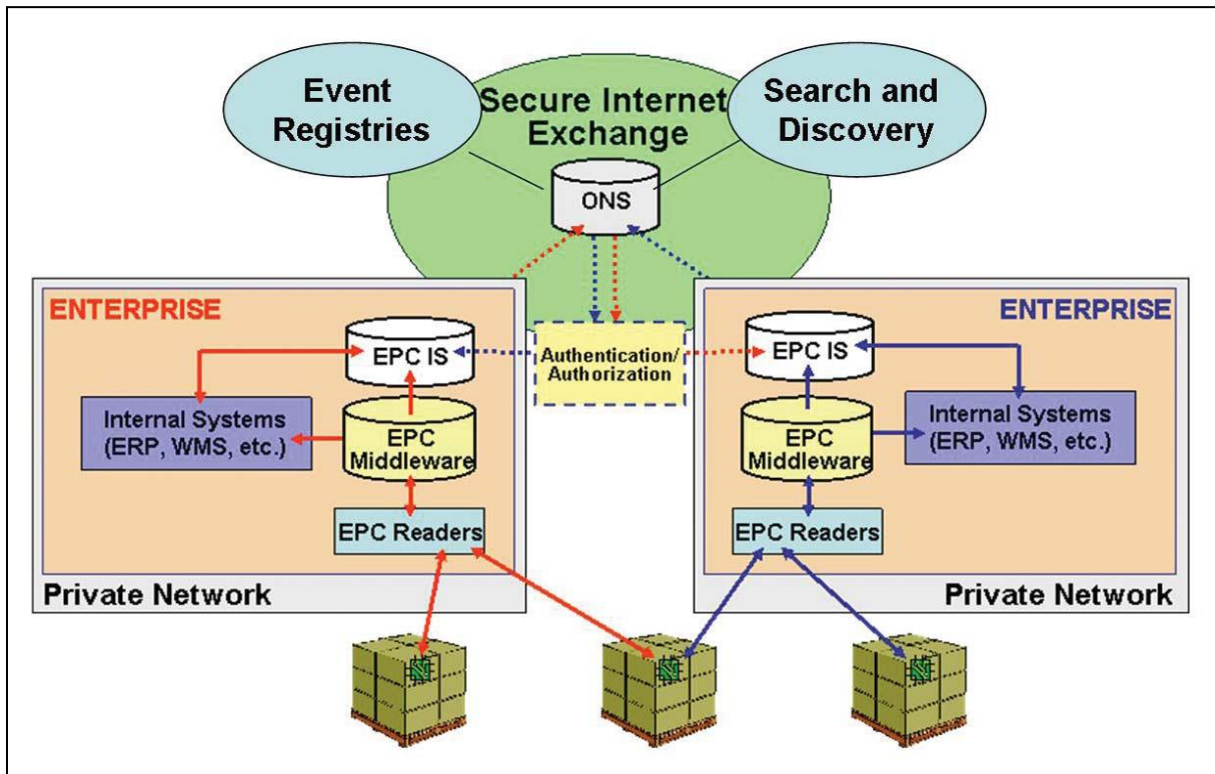


Figure 1: GS1 architecture target

3 ECOLOGISTICS DEMONSTRATOR

3.1 Demonstrator requirements

Several used of Ecologistics demonstrator were defined when the project started:

- Proof the added values of EPCIS solution for the supply chain management to interested companies.
- Tool for companies interested by the possibility to test EPCIS utilization
- Tool for student or companies training.

The demonstrator must probe that a company using RFID or Barcode Reader could access to EPCIS without investments in new readers. So the demonstrator will use: RFIS Readers and Barcode Readers.

The EPCIS capture and query must be open-source to be downloadable on Ecologistics Website.

Companies could connect to any Ecologistics demonstrator EPCIS repository.

The applicative part of the demonstrator must be downloadable for free on Ecologistics Website.

The demonstrator must be compliant to GS1 Standard for EPCIS.

A specific EPC Network will be developed including security, authentication and authorization preliminary.

A security analysis will be done in a specific work package during development. The result will be complementary security function for the demonstrator. Analysis and roadmap will be in a specific security document. This document will be available on the website.

The following figure summarizes demonstrator requirements.

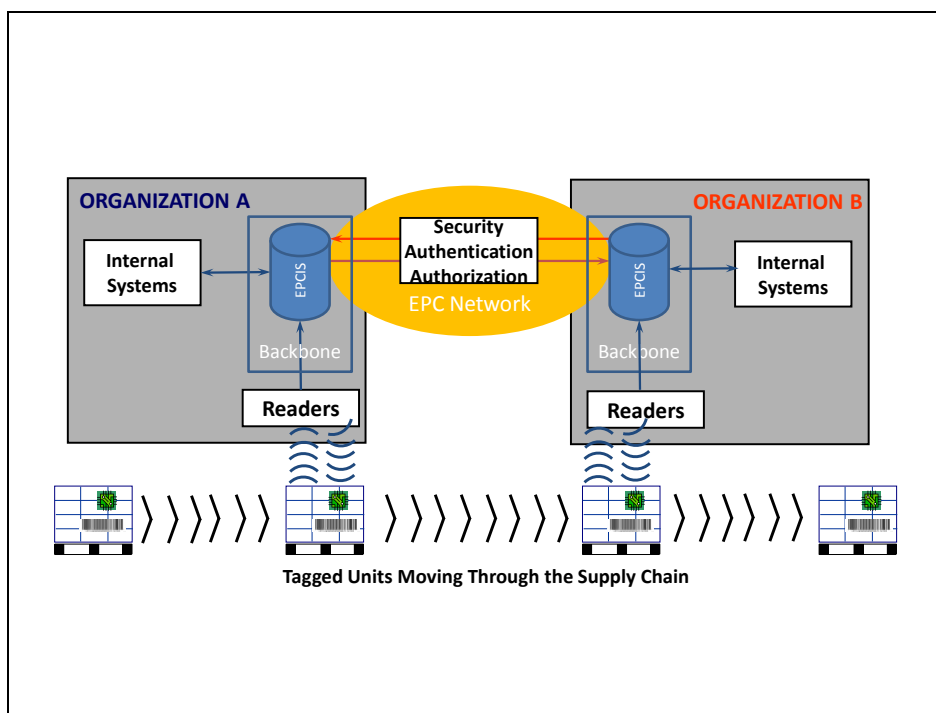


Figure 2: Demonstrator Functional Architecture.

EPCIS capture is developed in compliance with:

- LLRP RFID Reader
- Barcode Reader
- Rifidi Simulator

EPCIS query is developed compliantly with GS1 standard.

A new EPC Network is developed with security functions.

Applicative software will be used to access EPCIS and presents data from EPCIS but also internal company's data (GPAO, WMS, etc...).

3.2 Demonstrator architecture

The following figure summarizes demonstrator architecture.

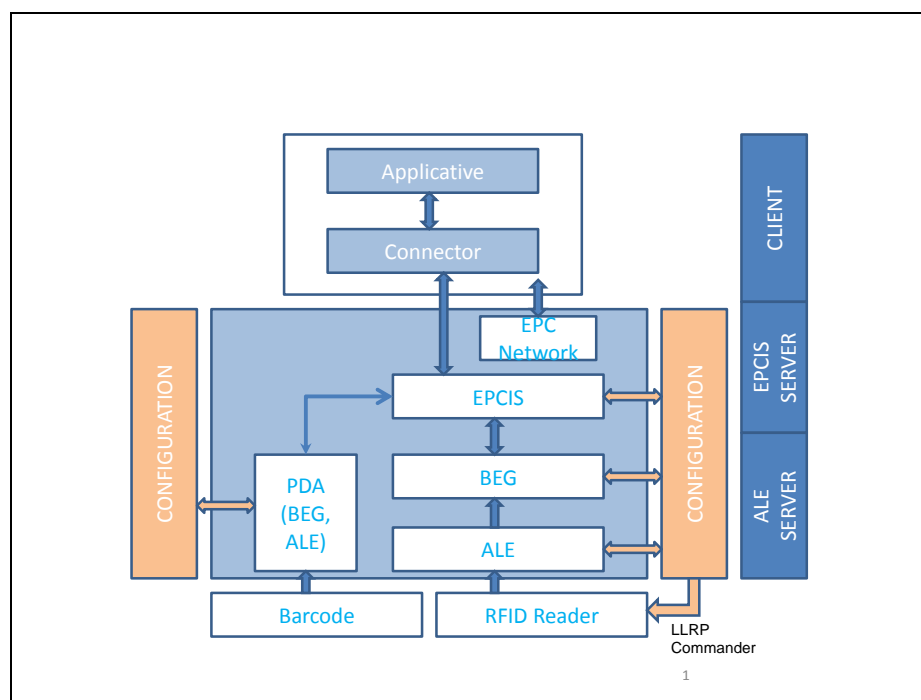


Figure 3: Demonstrator Architecture.

Demonstrator is physically based on three parts:

- EPCIS servers and capture interface: this part contents RFID interface, or barcode interface, filtering module, Business Event Generator, EPCIS repository. This part is distributed between (numbers could be variables):
 - LLRP compliant RFID Readers
 - PDA barcode readers
 - ALE Servers : Filtering and Interface
 - EPCIS Servers : EPCIS repository, BEG, Filtering and Interface
- EPC Network: EPCIS network for exchange with security functions.
- Client Computer: ERP Application, EPCIS server connector, EPCIS network connector.

Some configuration tools are adding to allow the system configuration. This configuration means logistics configuration regarding the scenario which will be implemented on the demonstrator.

3.3 Demonstrator design

One of the main requirements of the EcoLogistics demonstrator is to be developed on open-source solution to allow a free access to the demonstrator.

This requirement drives us to analyze what modules are available on open-source products.

After this analysis, we choose to build our demonstrator on three open-source developments and products:

- Fosstrak : open-source RFID software platform that implements the GS1 EPC, with or without EcoLogistics adaptation,
- AspireRFID is an open-source RFID middleware project that was launched during the second half of 2008 by the OW2 Consortium, an independent industry community dedicated to developing open-source code middleware, and a European research project known as ASPIRE, co-funded by the European Commission in the scope of its Seventh Framework Program (FP7), with or without EcoLogistics adaptation,
- EcoLogistics specific developments.

3.3.1 EPCIS servers and capture interface

The following figure presents the repartition of the previous developments for EPCIS servers and capture interface.

The color legend for the figure is:

- Salmon : Fosstrack,
- Blue : AspireRFID,
- Dark Green : Ecologistics developments,
- Transparent Green: Ecologistics adaptations.

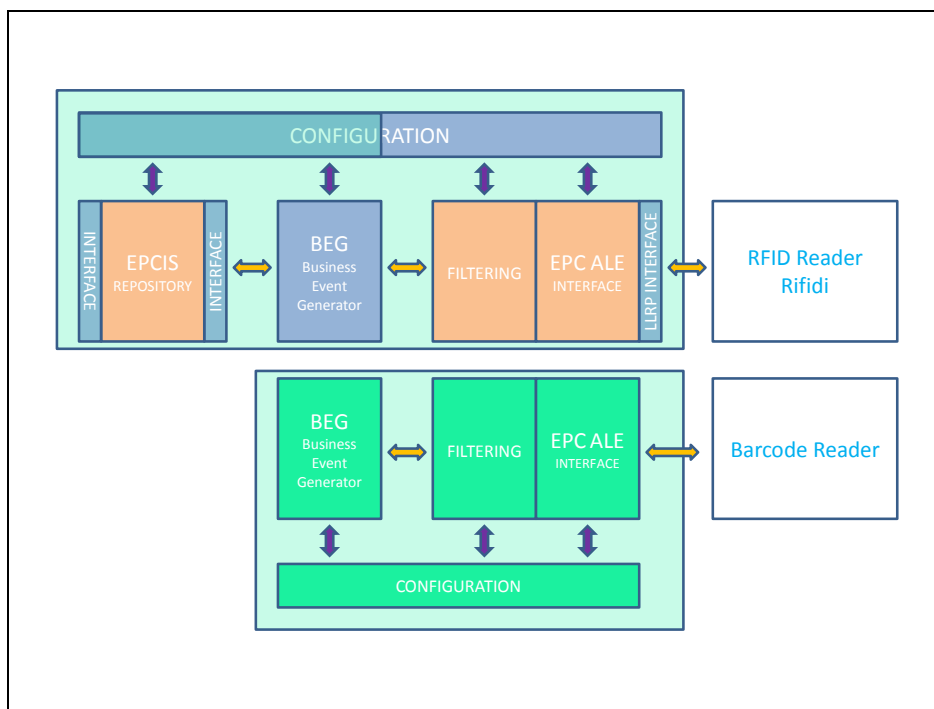


Figure 4: “EPCIS servers and capture” Demonstrator Design.

The repartition between open-source developments is:

- RFID supply chain :
 - Fosstrack :
 - EPCIS repository module,

- Filtering module,
- EPC ALE module.
- AspireRFID :
 - EPCIS repository module interface,
 - BEG module,
 - LLRP interface,
 - RFID Supply chain configuration (V0).
- Ecologistics :
 - Porting AspireRFID Linux development to Windows 32/64 bits OS,
 - RFID supply chain configuration (V1): EPCIS, BEG.
- Barcode supply chain :
 - Fosstrack :
 - EPCIS repository module,
 - AspireRFID :
 - EPCIS repository module interface..
 - Ecologistics :
 - Porting BEG module on Windows CE,
 - Porting Filtering module on Windows CE,
 - Porting EPC ALE module on Windows CE,
 - Barcode supply chain configuration: BEG, filtering, EPC ALE.

3.3.2 EPC Network

3.3.2.1 Network

EPC Network is totally developed by EcoLogistics and could be presented as following in next figure.

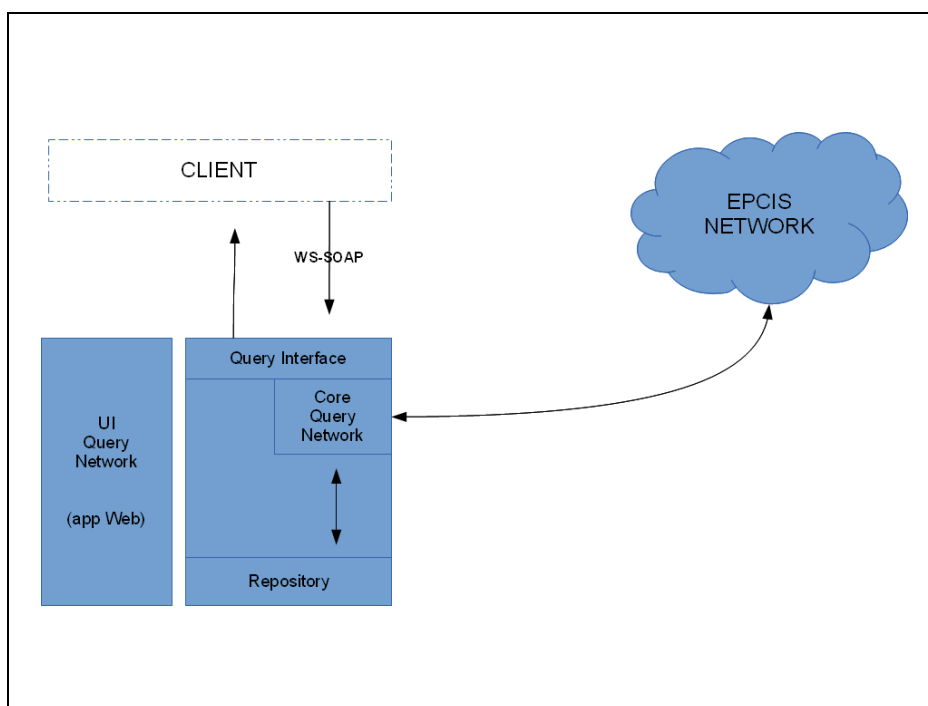


Figure 5: “EPC Network” Demonstrator Design.

When any query is done by client, that query is declined into an local ECPIS Query, and a network EPCIS query.

The network EPCIS query will be a systematic query for all EPCIS servers in the range of address declared (public IP address).

The configuration of the EPCIS servers in the range could be configured by a specifically, developed user interface.

3.3.2.2 Security

As explained, earlier in the present document, the development of security functions described is a preliminary version.

A complete study about security will be done during EcoLogistics project. The results of the study will constitute the final specifications for security aspect.

The preliminary version includes two parts:

- The first part allows owners to define what is the accessibility of his data :
 - List of data,
 - List of attributes,
 - Who can access to which data or which attribute.
- The second part controls access to data:
 - Authentication of the client (login, password),
 - Authorization of the client.

To define accessibility to his data, users have a graphical interface.

Access controls to data is an embedded real time functions. An no authorized attempt to data is logging in a logbook.

The following figure presents the security functions architecture.

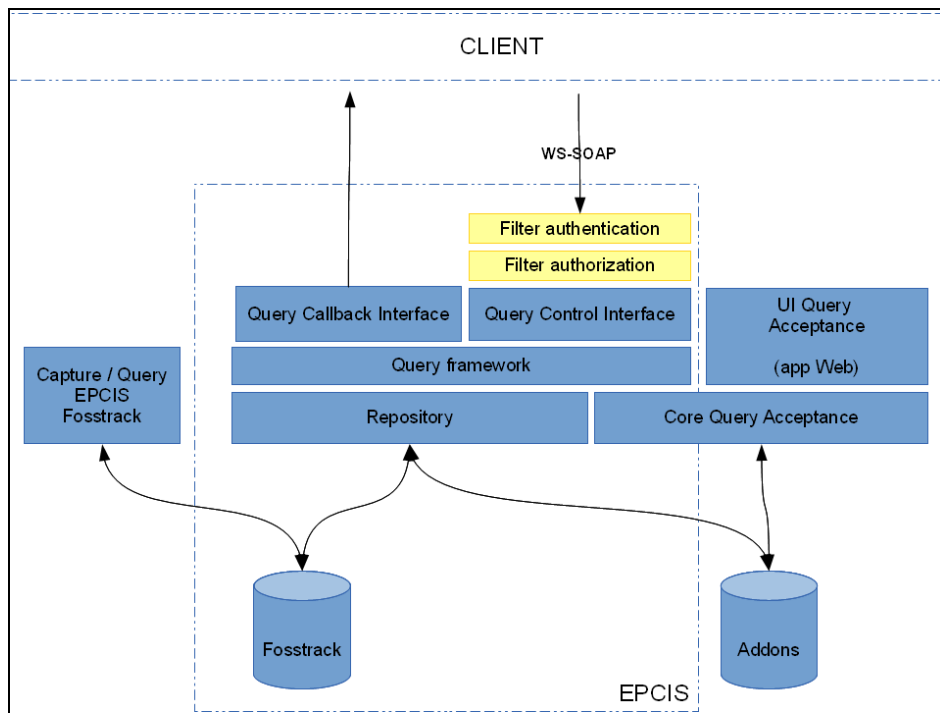


Figure 6: "Security functions" Demonstrator Design.

3.3.3 Client

The client is constituted of an applicative tool and a connector to the EPCIS repository.

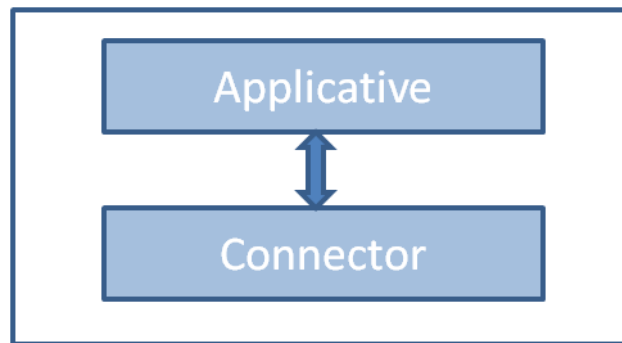


Figure 7: “Client” Demonstrator Design.

The applicative is a way to focus on the added value of EPCIS and EPC network solution to improve efficiency for logistics supply chain.

We also choose an open-source applicative: OpenERP named now Odoo.

4 PHYSICAL ARCHITECTURE

4.1 General Description

The following figure presents the physical architecture of the demonstrator.

Backbone is located in Mons.

Clients are located where partners need it, to demonstrate logistics application.

RFID and Barcode Readers could be deployed anywhere regarding scenarios requirements.

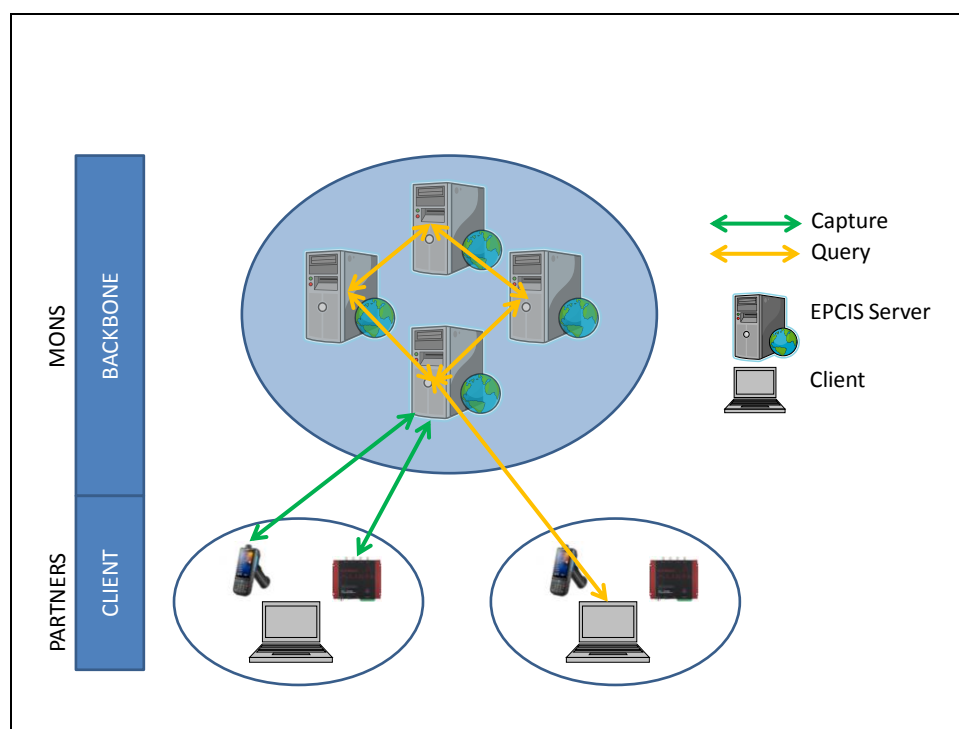


Figure 8: Physical Demonstrator Design.

4.2 Backbone

Backbone is installed and maintains in Mons.

Up to 6 EPCIS servers are available

Up to 2 ALE servers are available.

ALE and EPCIS servers are accessible by public IP address. Configuration is done by Mons partners regarding needs expressed by WP4 partners regarding scenarios or training.

4.3 Client

Clients are installed and maintain by Odoo WP3 partners.

Clients are provided by WP4 partners.

Configuration is done by WP4 partners regarding scenarios or training. Odoo WP3 partners support WP4 partners for deployment.

WP4 partners provide, install and configure barcode and RFID readers to play scenarios.

5 EXTERNAL USABILITY AND ACCESS

This demonstrator is used by Ecologistics partners:

- To demonstrate the added value of EPCIS and EPC network solution,
- To train companies, students, etc..

External companies could also access to the demonstrator:

- To use and test it,
- To run it,
- To develop their own application,

5.1 To use and test it

Any company interested by access to EPCIS repository can access to Ecologistics one, on demand addressed to the coordinator.

Any company interested by access to ALE servers can access to Ecologistics one, on demand addressed to the coordinator.

Any company interested by access to EPC network can access to Ecologistics one, on demand addressed to the coordinator.

Any company interested by an access to its EPCIS repository can ask Ecologistics, by demand addressed to the coordinator.

5.2 To run it

Executable of backbone and client development could be available on demand to Ecologistics coordinator during the project.

At the end of the project, executable code will be downloadable on Ecologistics website.

5.3 To develop their own application

Source code of backbone and client development could be available on demand to EcoLogistics coordinator during the project.

At the end of the project, source code will be downloadable on EcoLogistics website.