Technical session - Envisioning the port of the future (III): The 2030 Future of Federated Systems

AEOLIX: Architecture For European Logistics Information Exchange - Beatrice Di Pierro (Univ. of Trieste)

Why to use It AEOLIX - Giorgio Iacobellis (Univ. of Trieste)
MidTerm Conference: Envisioning the Port of the Future: the 2030 horizon

AEOLIX: Architecture for EurOpean Logistics Information eXchange for logistics services

4th of April 2019 – Port of Trieste

Speaker: Beatrice Di Pierro, Eng.

Polytechnic of Bari, Email: beatrice.dipierro@poliba.it
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- Challenges
- Logistics & Supply Chain needs
- The AEOLIX network
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Background & needs

• The main priorities for EU policy over the coming years are **Jobs, Growth, Investment** and **A Digital Single Market**

• The goal is to foster growth, competitiveness, jobs and the development of internal market by making better use of the opportunities created by digital technologies

• EC launched the Digital Transport and Logistic Forum (**DTLF**) which brings together stakeholders from transport and logistic industries

• Absence of a common framework, architecture, business model and governance structure for connecting corridors across-borders using existing IT systems and services
Background & needs

Standardisation

- Many digital platforms on freight transport and logistics:
  - EC FP & H2020 Projects solutions
  - Port Community systems (PCS) & Cargo Community System (CCS)
  - e-Customs platforms
  - Single Window platforms
  - Proprietary ICT /ITS Solutions
- Open standards and EU initiatives
  - UBL/XML, EDIFACT, GS1, Open Data Standards, DATEX II
  - ITS Directive, RIS, eMaritime
  - (ETPs), such as ALICE, ERTRAC, ERRAC, Waterborne
Background & needs

Global policy changes - emissions

- Logistics actors have started to implement environmentally friendly collaborative strategies addressing supply chain.

- The existence of different standards & initiatives each with own methodology and calculation tools for carbon footprint of transport is hampering the comparison and analysis of results.

- Logistics companies still need to track, document and disclose their CO2 emissions as customers now want to know more about the supply chain provenance of the products they buy.

- Logistics companies face continuous economic pressure and need to improve further their operations in order to survive.
Background & needs

An industry in transformation: Consolidation
Background & needs

CONSOLIDATION AND FRAGMENTATION IN THE LOGISTICS INDUSTRY

- **Visibility services**: 69%
  - The majority of the analysed market considered SC visibility as one of the most innovative services in the industry.

- **Marketplace**: 20%
  - A small percentage of companies operate an online platform.

- **Routing**: 11%
  - Routing is between the least widespread services among the companies.

- **Data and documents management**: 34%
  - One third of the companies are using data and documents management software.

- **Data exchange (one-way or two-way)**: 37%
  - There is some sort of data exchange between these users.

- **Data collection**: 40%
  - Less than half studied business had a way to collect data for the user to analyse.

- **TMS service**: 26%
  - Transportation Management Software packages were offered to businesses in order to make their processes easier.

- **Event/risk prediction**: 9%
  - Approximately 1 out of 10 companies offer through predictive analytics and hardware, services related to risk or events.

- **Estimated Time of Arrival (ETA)**: 20%
  - ETA, unlikely visibility services is not a common service.

- **e-CMR**: 11%
  - e-CMR documentation is starting to be offered in applications.

- **Port services**: 6%
  - A very small portion of the analysed companies offers services at the ports.

- **Custom brokerage services**: 17%
  - out of 6 companies provide services at the customs.

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Beatrice Di Pierro, Eng., Polytechnic of Bari,  
Email: beatrice.dipierro@poliba.it
What is shaping the future of global logistics markets?

- Supply chain visibility will soon be standard business practice (2-5 years)
- AI and Block chain (10+ years)
In the absence of a common framework, architecture, business model and governance structure for connecting corridors across-borders using existing IT systems and services, AEOLIX was launched in September 2016 also with the aim of:

- **optimization of cargo flows**
- the **facilitation of supply chain** management
- the **reduction of administrative burdens** and
- to make **better use of existing resources**.
AEOLIX Community Ecosystem

- **End Users**: logistics service providers, shippers, retailers, terminal operators, ports, forwarders, etc.
- **Public Authorities** at the local, national and European level
- **Service Providers and Developers**
- **Service Enablers**
- **Technology Suppliers**
AEOLIX Community Ecosystem

Figure 1. AEOLIX Platform High Level Overview

Beatrice Di Pierro, Eng., Polytechnic of Bari,
Email: beatrice.dipierro@poliba.it
Living Labs

AEOlixir is testing, validating and demonstrating the collaborative logistics ecosystem in a number of living labs which cover all the nine TEN-T corridors.

Living Lab 1:
Intermodal Logistics Management – Port of Hamburg, Frankfurt/ Rhein-Main area (Germany)

Living Lab 2:
Termi Lab – NTEx terminal network, hauliers, customs operatives (Sweden and around the North Sea)

Living Lab 3:
PMCG Logistics – Malmö intermodal terminal, COOP central DC in Bro (Sweden)

Living Lab 4:
Inland Waterway Danube – The Danube Countries

Living Lab 5:
Multimodal Information Exchange and Collaboration – Thessaloniki (Greece)

Living Lab 6:
Intelligent Port and City – Port of Bordeaux (France)

Living Lab 7:
Collaboration in Automotive Industry – Galicia (Spain)

Living Lab 8:
Cross Chain Collaboration – Rotterdam, Venlo (Netherlands), Duisburg (Germany), Milano (Italy)

Living Lab 9:
Collaboration in Automotive Industry – Galicia (Spain)

Living Lab 10:
UK - Europe – Far Eastern Logistics Control Enhancement – Northampton (UK) and mainland Europe
LL4: Intermodal e-Customs

Consortium Partners:
- University of Trieste and Polytechnic University of Bari
- SAMER&Co. Shipping supported by Info.era
- Interporto di Trieste

Associated partner involved in the LL4:
- Port Authority
- Autovie Venete (motorway)
- Customs agency

Objective:
Optimization of the customs procedures and the enhancement of the intermodal transport efficiency and quality in Trieste, and thus position the port and the Interporto di Trieste to be able to manage future growth, in particular to foster railway traffic.
AEOLIX Benefits

- Enhanced supply chain visibility
- More efficiency and better resilience
- Fewer costs less administrative burden
- New business opportunities
- Automation of data flow
- Optimised choice of transport services
- Better transport and event management
- Increased load factors
- Fewer CO$_2$ emissions
- Interoperability in line with EU standards
Get engaged to AEOLIX network events

SAVE THE DATE
Final Event
26 June 2019
Hamburg, Germany
Thank you for your attention!

- info@aeolix.eu
- www.aeolix.eu
- @AEOLIX_Platform
MidTerm Conference: Envisioning the Port of the Future: the 2030 horizon

AEOLIX: why to use it?

4th of April 2019 – Port of Trieste

Speaker: Giorgio Iacobellis PhD, Eng.
Polytechnic of Bari, Email: giorgio.iacobellis@poliba.it
Outline

• Introduction
• AEOLIX goals
• AEOLIX approach
• Architecture overview
• Trieste Living Lab application
• guide.me app
• Conclusions
Introduction

“Information is power only if you can take action with it. Then, and only then, does it represent knowledge and, consequently, power.”

Daniel Burrus

Information should be:
- Easy to access
- Easy to share
- Easy to control
- Useful/Tailored
- Data format
AEOLIX goals

• to provide technological solutions to enhance and simplify collaboration among actors along the supply chain;
• to adopt and provide core functionalities to improve, optimize and automate transport and logistics operations within supply chain collaborations;
• to simplify information exchange within an integrated security framework.
AEOLIX goals

Technical issues:

• Different actors use different languages
• Different actors may be interested in the same information
• Security (who can access to the information)
AEOLIX approach

- Publish/Subscribe pattern
- Authentication and accreditation
- Toolkit accessible through the platform (Estimation Time of Arrival, performance evaluation, CO2 monitoring)
- Coding/deconding of messages in an Internal standard messages structure
Architecture overview
Trieste Living Lab application

AEOLIX

Motorway (other)  Carrier (other)

PCS (Info.era)

Giorgio Iacobellis PhD, Eng., Polytechnic of Bari, Email: giorgio.iacobellis@poliba.it
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When a Member creates a data source, he can set its status to public. The new data source will appear in a catalogue and any Member can request access to it.
## TRIESTE ETA vesselImportJSON

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Data format

- The XML data format for ships arrival information has been proposed.
- LL4 DSS translates information from PCS into this structure.
- This data format allows interoperability.
- Each “vessel” element in the list contains several elements. Syntax is described in the schema.
- Similar schemas have been created for other datasets: e.g. customs clearance status for trucks on the ship.
AEOLIX

LL4-LL6 Interoperability

Giorgio Iacobellis PhD, Eng., Polytechnic of Bari,
Email: giorgio.iacobellis@poliba.it
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https://recette.noscifel.com/external/eta?token=04301530723#!Table
guide.me is a component of the Decision Support System (DSS) implemented by the Living Lab 4 (Trieste), and it supports truck drivers on their way to destination.
Giorgio Iacobellis PhD, Eng., Polytechnic of Bari, Email: giorgio.iacobellis@poliba.it
AEOLIX Connectivity Engine

Publish ETA Information

ETA Information Channel

Subscribe ETA Information

Send position

Real-time ETA update

LL4 DSS displays ETA on the mobile APP and communicate it to LL4 PCS

Giorgio Iacobellis PhD, Eng., Polytechnic of Bari,
Email: giorgio.iacobellis@poliba.it
Giorgio Iacobellis PhD, Eng., Polytechnic of Bari, Email: giorgio.iacobellis@poliba.it
Management of data feeds on the AEOLIX Dashboard

- AEOLIX connectivity engine used for management of data feeds (ship information) across Ports.
- Example: dashboard overview
Conclusions
• The AEOLIX platform is presented
• Finally the Trieste Living Lab implementation is presented

Advantages
• The information exchange is simplified
• The data protection and access is fully customizable
• The B2B approach is supported by the connectivity APIs
• The Publish/subscribe pattern allows the connection of software created by third party
• It is possible to integrate other platform
AEOLIX: why to use it?

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