

Project	Extended Single Window – Information Gateway to Europe: New Information and Governance Models for International Trade & Logistics
Theme	Mainports in Control
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Partner organizations	ACN, Arrow, Cargonaut, Delft University of Technology, Dohler, EVO, FloraHolland, Fontys Hogeschool, Frugi Venta, Havenbedrijf Amsterdam, Havenbedrijf Rotterdam, Mattel, NHTV NV Regio Venlo, OCE, Portbase, Schiphol NV, Tilburg University.

Motivation

This research projects develops solutions to major issues faced by international logistics industry:

- Need for seamless and reliable supply chains
- Compliance to revised European coordinated border management procedures
- Need to reduce the costs of compliance to governance requirements

The vision is to develop an integrated coordinated border management solution for ports and airports integrating with previous and subsequent procedures for reliable, secure, and cost effective logistic chains as a prerequisite for the Netherlands to serve as an excellent gateway to Europe. This coordinated border management, 'Extended Single Window', requires efficient and reliable information for effective joint supply chain planning by shippers, goods owners, transportation companies, forwarders, terminals and other logistic service providers and to use this information to meet government laws and regulations in a cost effective way, e.g. customs and agricultural procedures and VAT.

The main purpose of Extended Single Window is re-usability of business data by all government authorities for all types of goods movements. Within the context of Single Window, two main approaches can be distinguished:

- The first approach is still a transaction based declaration approach. It is the objective of government authorities to extend such an approach with information re-use between authorities based on one declaration and events for exchanging updates of declaration data by business.
- In the second approach, business processes of logistic actors gather all relevant information, including physical cargo/container tracking by for instance GPS technology. This information is available to government authorities like customs and allows these authorities to track goods movements across borders. This approach based on a data pull principle (e.g. like experimented in ITAIDE) extended with an event mechanism indicating any changes thus allowing seamless and paperless logistics. It requires federated security mechanisms and globally accepted open standards.

Objectives & goals of the project

The objective of the project is to create reliable, secure, and cost effective logistic chains throughout the Netherlands supporting all applicable regulations and procedures, by embedding events for government controls in supply chains based on safeguards in processes of certified supply chain partners, re-use of business transaction data by government agencies, and enabling existing Port Community Systems to behave as one Information Service Bus with innovative IT. The aim is to identify which safeguards for government controls need to be defined and how they can be supported by advanced IT with contribution of business and government authorities and in close cooperation with various demonstration projects (single window, Authorized Economic Operator (AEO)/system-based controls, centralized clearance/Single Authorization for Simplified Procedures). The approach is expected to lead to a drastic reduction of physical inspections of goods in the mainports by coordinated planning of government authorities, reliable transport to and from hinterland hubs, and administrative cost reduction.

The main business objective is reliable logistics for all types of goods flows by coordinated border management of relevant authorities in the Netherlands:

- Increase of supply chain reliability and reduction of logistic costs by coordinated inspection planning of government authorities.
- Reduction of transaction costs since information is shared amongst government authorities and re-used between regimes by a government authority (e.g. re-use between export and outgoing).
- Improvement of effectiveness of government authorities to deal with a growing volume of goods flows by subscription to logistic events.
- Improvement of security by data sharing amongst relevant actors in supply chains according to a common ontology specifying semantics of logistics.
- The ability to support both a declaration based approach and system based auditing by business models for the implementation of events and the ontology.
- Improved release of goods by (seamless) integration with previous and subsequent applicable procedures implemented by for instance SASP.

At national level, the competitiveness for managing logistic flows across Europe is expected to increase and with additional value added services (see an estimate of the contribution of added value in supply chain control further on). The research objectives are described under the research approach.

Research approach

Basic research in advanced information technologies is in Event Driven Architecture with a Logistic Interoperability Ontology to realize piggy-backing and data pull. The research objectives are:

- Design of a smart auditing framework based on Event Driven Architecture and Service Oriented Architecture for logistics and its governance. This includes constructing a model for implementing events as safeguards in business processes to meet government regulations and procedures in line with the MCC and other applicable (EU) regulations.
- Development of a flexible and scalable Event-Driven Governance and Information Orchestration (EDGIO) model to ensure that information is available where and when needed. Such a model captures organizational and technical issues. The EDGIO model can be used in import/export situations as part of the event driven Information Service Bus (ISB).
- Construction of a Logistics Interoperability Ontology Framework as the basis for the Virtual Logistic Data Space. The ontology is used for describing semantics (1) shared amongst all actors in logistics chains and (2) supporting individual actors in their business processes and mapping their internal data to the shared concepts. Such an ontology framework may consist of components defining the semantics of individual (physical) objects and will build on international developments like the WCO data model and the UN/CEFACT Core Components. Further research is required into the fact that it is required to define different ontologies based on common components of the framework, whereas each ontology defines a specific view on the framework, e.g. an interoperability ontology, an ontology for an enterprise import/exporting for instance electronic equipment and for an enterprise importing/exporting toys. Part of the research will also be on the potential impact on ease of development and application of ontology constructed of components with distributed maintenance.
- Proof of Concept of the Information Service Bus built on the Event Driven Architecture and the Logistic Interoperability Ontology that will have a distributed nature in its realization. From a logistic perspective, the Information Service Bus will act as a virtual logistic data space in which actors share relevant information triggered by events of their business processes. In this way, the ISB will actively support data and process integration.
- Evaluation of the feasibility of the aforementioned concepts by (1) constructing different business models and (2) improving the figures mentioned in section 1.4.3 of this proposal for the added value to supply chain coordination in the Netherlands. The business models will illustrate different implementations of the concepts with their advantages and thresholds for different logistic actors.
- Exploration of the innovation potential of the Information Service Bus and the Virtual Logistic Data Space in terms of audit process redesign and an evaluation framework based on explicit control effectiveness and costs criteria.

Expected results

Project deliverables include:

- A model for event driven data sharing amongst actors in logistic chains across borders that includes events to meet applicable government regulations and re-use of relevant data amongst actors.
- The Event-Driven Governance and Information Orchestration model for coordination of actors in organizational networks.
- A framework of (ontology) components that allows (1) interoperability amongst all actors in logistic chains and (2) individual actors to execute their specific business processes. As stated before, the framework will be as much as possible based on existing models and components like the WCO data model.
- A model and a proof of concept of the Information Service Bus.
- A business model that evaluates the feasibility to meet the aforementioned business requirements and contribute to the increase of added value in supply chain control.
- Case studies in process innovation based on existing or to be developed technical solutions.
- An evaluation framework for Service-Oriented Auditing based on explicit control effectiveness and costs criteria.

Furthermore, it is the intention of the enterprises to initiate demonstration projects that will both feed the R&D and apply the R&D results. Government authorities are developing a Single Window approach that can be improved by the research, and PCS's will have the ability to construct a durable solution for their customers in line with government procedures. Finally, the expected contribution to the ambition formulated by de Commissie Laarhoven to increase the Added Value in Supply Chain coordination activities from EUR 3 billion to EUR 10 billion in 2020 follows from a combined top-down approach and bottom-up approach, and is estimated to result in an increase of EUR 194 million per year in Added value of supply chain coordination.

