SELIIS Towards a Shared European Logistics Intelligent Information Space

Living Labs

Overview

IPIC 2019

London 10 July 2019

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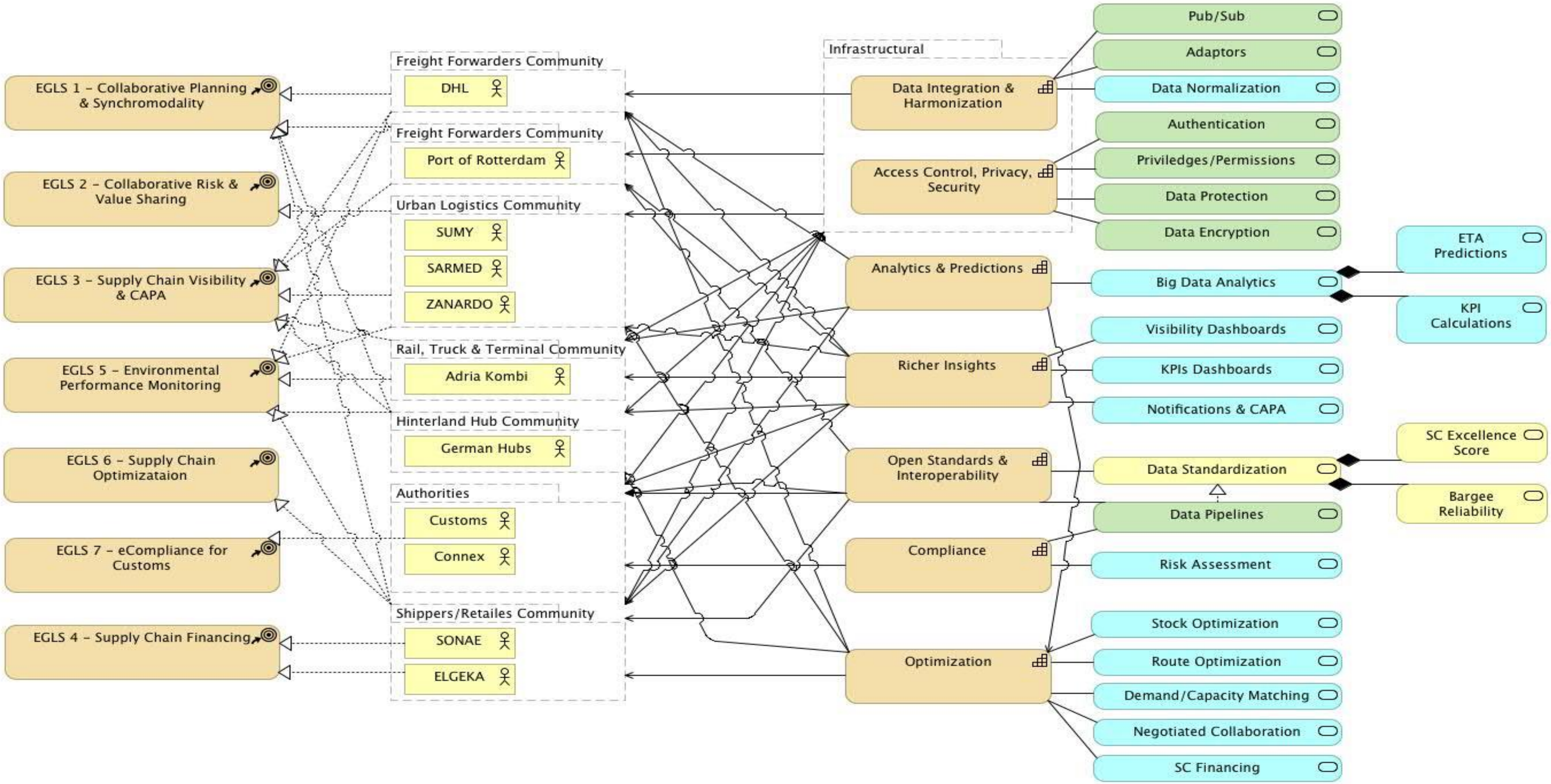
Agenda

Presentation Sections

SUMMARY

Scope of this presentation is to provide an overview of SELIS Living Lab's, briefly covering for each LL it's scope, key achievements and what has been the impact, along with a brief insight on the developed solutions.

Living Labs – Strategies & Key Components



Towards a Shared European Logistics Intelligent Information Space

Living Lab 1 – Freight Forwarders

DHL

LL1 DHL - Scope

Use Case 1 & 2 – Data Consolidation & Visualization and Strategic DSS

Business Problem(s)

- **Complex and time-consuming integration and consolidation of historical & real-time data** coming from different sectors and customers
- **Lack of visibility** on the overall transport service for the stakeholders involved in the Supply Chain: DHL, DHL customers and Hauliers
- **Inefficient Route planning** due to luck of holistic SC visibility, hindering strategic decision capability

SELIS Solution

- SELIS provided seamless **integration**, consolidation, **data restructuring** and visualization capabilities
- **Route and Truck load Optimization** over DHL business operations to facilitate the prediction of how a new situation could affect the overall cost structure

LL1 DHL – Achievements & Impact

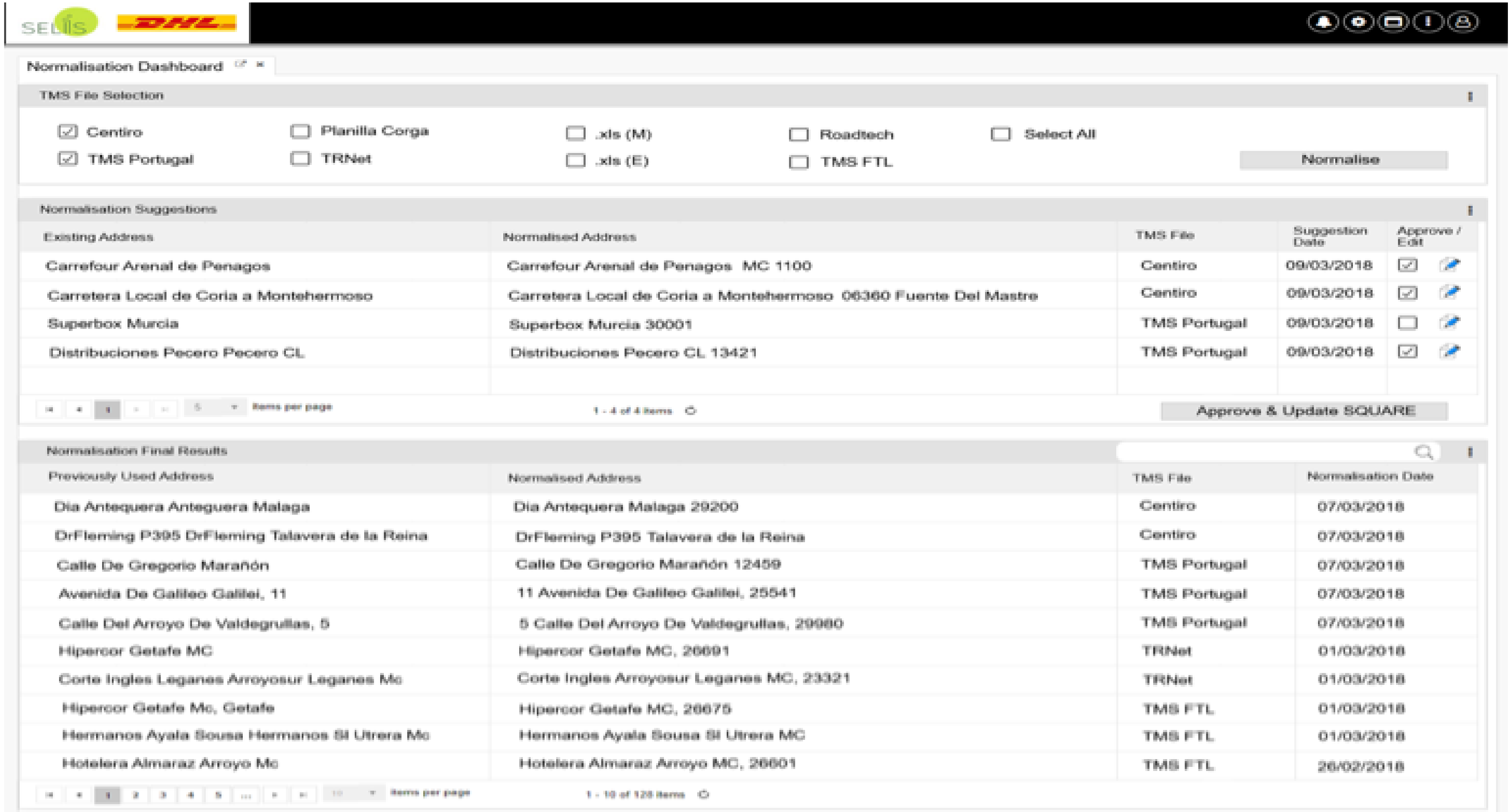
Major Achievements

- **Normalization Engine** tested and validated (Machine Learning)
- **Communication Infrastructure** (inc. Adaptor to DHL's AM+)
- Data Analytics Implemented
- **KPIs** & **CAPA Dashboard**
- **Route Visualization Prototype**
- **Planning** and **Route Optimization Prototype**

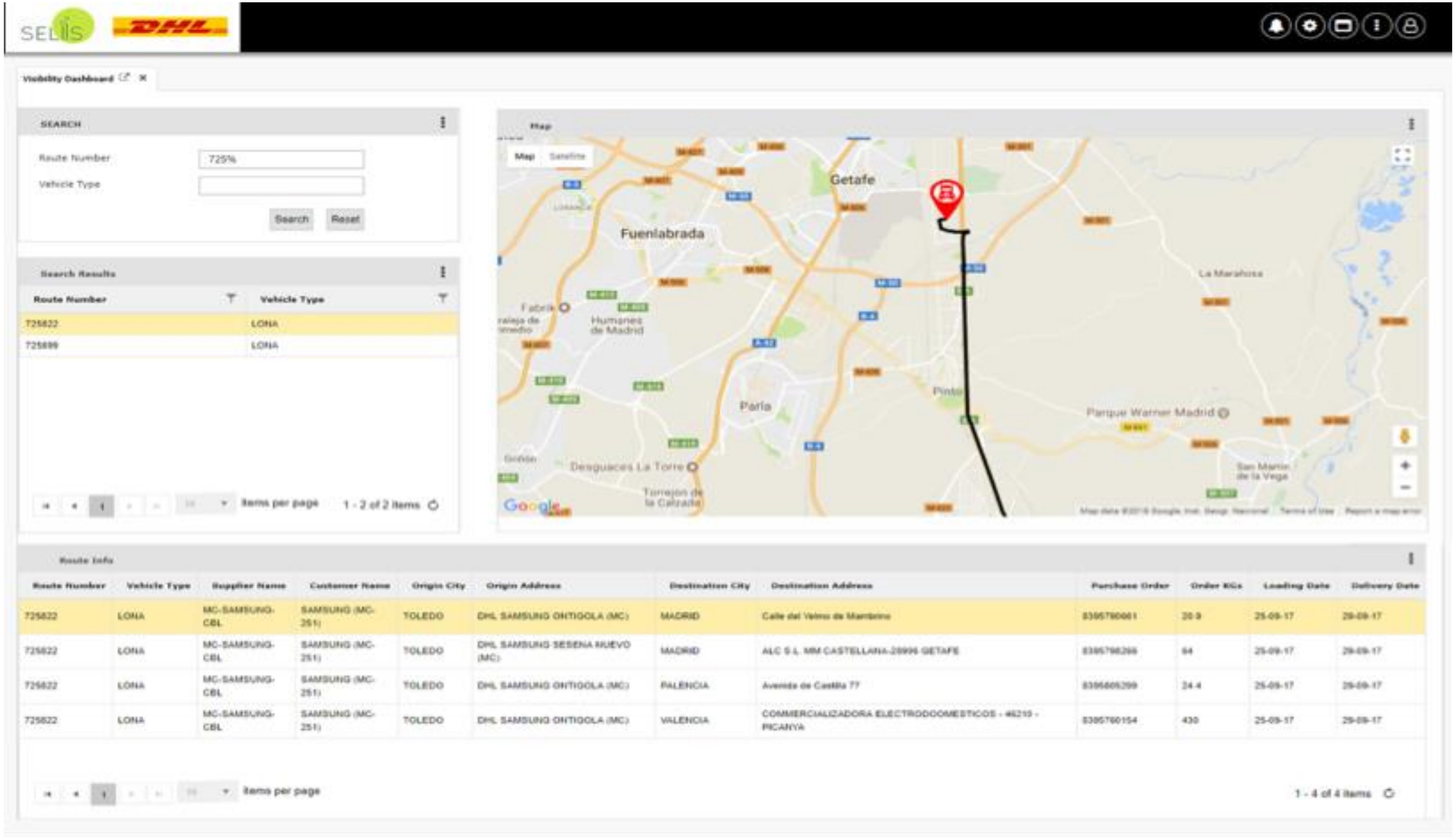
Business Impact

- **Increased internal and external visibility**, improved service quality, customer satisfaction (through reduced response time) and resource utilization.
- Facilitates **strategic decision-making**, improving cost management and CO2 footprint
- **KPIs improvements**:
  - >5% CO2 reduction
  - >5% Increase in round trips
  - >20% reduced man-effort for optimized route planning

LL1 DHL– Configuring Data Normalization Engine



LL1 DHL – Route & Transport Events Visualization



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Living Lab 2

Port of Rotterdam

LL2 PoR – Scope

Use Case 1 & 2 – Reliability Standards & Measurement & Inland Barge Visibility Solution

Business Problem(s)

- **Reliability** is critical in choosing transport solutions by shippers and logistics service providers
- Reliability (of transit time) impacts **shippers' inventory costs**, ordering costs, shortage costs and excess costs
- **No standards** available for measuring inland transport reliability, which makes comparison between supply chains and transport providers difficult
- **Lack of visibility of intermodal** alternatives and lead times for inland barge transport

SELIS Solution

- Developed the **standards** as well as the necessary **application** for the Port of Rotterdam container community to **measure inland reliability** and **enhance mode selection**
- Utilized Big Data Analytics to further increase reliability of **KPI predictions**
- Inland **Barge Visibility solution** for **predictive modelling** based on real-time data and **decision support for booking**

LL2 PoR – Achievements & Impact

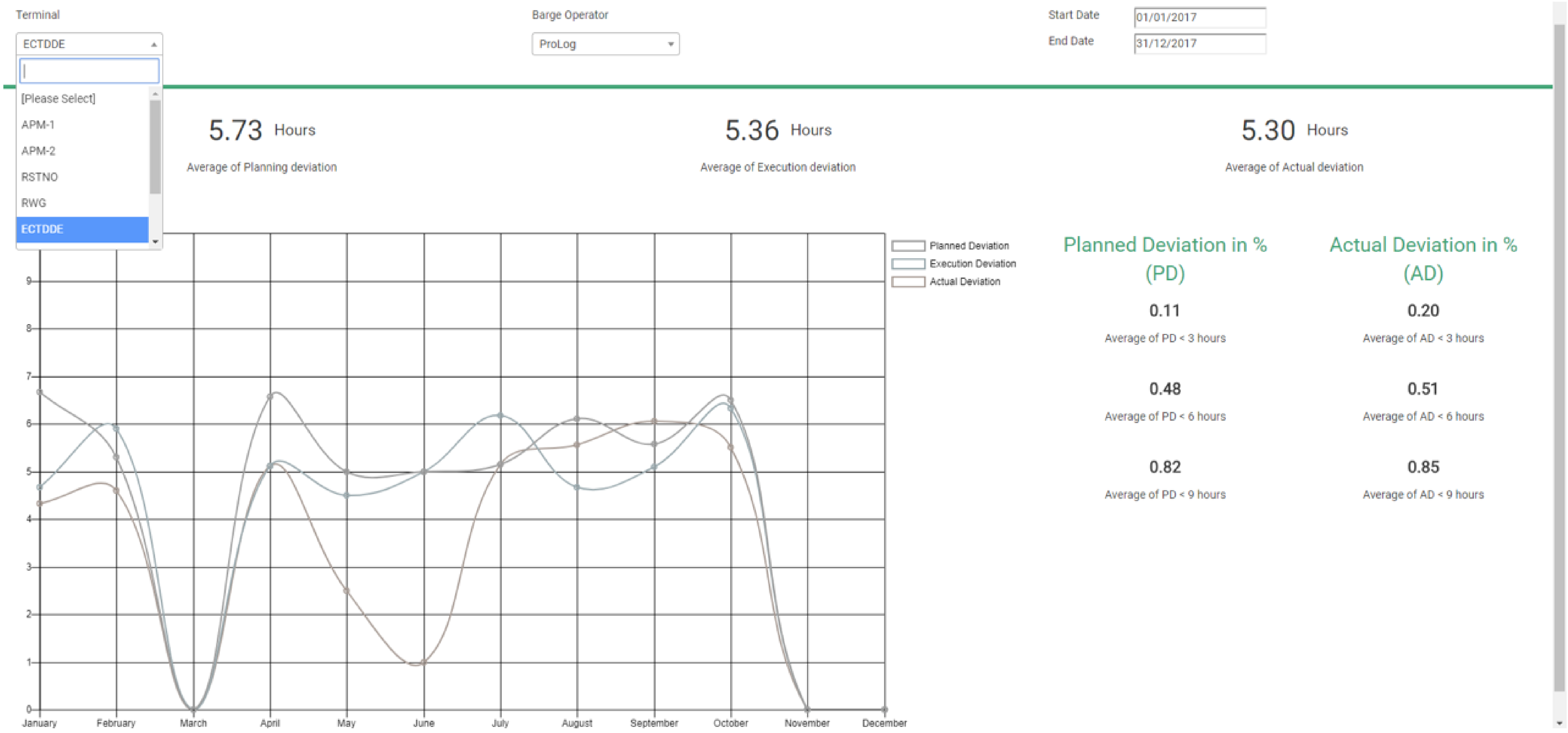
Major Achievements

- **Set-up of real corridors**: workshops held for each corridor with business stakeholders
- **KPIs Dashboard**
- Integration with SCN
- Big Data Analytics: developed a **predictive model for inland reliability**
- Utilized **AIS data** to do analytics on KPIs
- Realized simulation model
- **Dashboard with visibility** on (past) **reliability and predictive model** on future reliability in inland barge
- Integration with local Port Community Systems
- Predictive modelling based on real-time data and **decision support for booking**

Business Impact

- Inland Reliability dashboards, to facilitate:
  - **Benchmarking**
  - **Promote intermodality**
  - Predictive analysis and better aligning supply chains
  - Efficient operations
- **Improved use of barge capacity** , supporting modal shift from road to barge
- **KPIs**
  - Modal shift (%): >10 %
  - Occupancy rate increase: 5–10%
  - CO_2 Reduction: 5 – 10%

LL2 PoR – UC1 – Deviations Dashboard



Living Lab 3 – Urban Logistics

SUMY

LL3 SUMY- Scope Overview

UC1,2 & 3: Collaborative Planning, Monitoring and Strategic Assessment

Business Problem(s)

- Lack of **information sharing** infrastructure between collaborating parties
- Demand for **real-time monitoring of transport events** from multiple stakeholders and information sources
- Limited **awareness of the actual incurred costs** and risks segmented per individual partner

SELIS Solution

- Timely and securely **publish order data to the subscribed Service Providers** and utilize this information to improve route planning
- Real-time feeding, consolidation and exposure of **transport events** to interested parties
- SELIS **collaborative cost model** and calculation mechanism for valuing risks and gains per shipper

LL3 SUMY - Achievements & Impact

Major Achievements

- Implemented and tested **monitoring prototype**
- Implemented the automated **Transport Demand-Capacity Matching** prototype
- Experimented with **Cost Allocation models**
- Integrate solutions with production data
- Engaged **publish/subscribe communication** infrastructure
- Implemented **KPIs Dashboard** (utilizing EGLS5 on Environmental Reporting
- **Global Optimization** (**route** and **truck load** for multiple transport requests and capacity)

Business Impact

- Improved visibility on execution to facilitate collaborative planning of urban platform operations and **increased load factor**
- **Increased transport reliability** and Customer satisfaction
- **Reduced CO_2** emissions (improving public image)
- **Improved cost and risk allocation** between individual partners

LL3 SUMY - Collaborative Planning & Optimization

Demand/Suply Dashboard

Demand for Service

Departure Date	Shipper	Departure Point	Arrival Point	Total Volume	Priority
30/11/2017	Selecto Restaurant	Paul Boulangerie	Selecto Restaurant	1	
08/01/2018	Ocean Marée	BXL Chocolates	Sumy	2	
26/01/2018	Sumy	Paul Boulangerie	Sumy	1.5	

Available Services

Departure Time	Operator	From	To	Total Volume	Average Load
01/12/2017	Sumy	Sumy	Sumy	10	14%
03/02/2018	Sumy	Sumy	Sumy	100	0%

Optimized solution

Shipment from : Halve Man Brewery to Waterloo handled by Halve Man Brewery

Duration of Trip	From	Free Space	To
1h23min	Halve Man Brewery - Walplein, 8000 Brugge, België	60%	Paul Boulangerie - Rue de l'Enseignement 2, 1000 Bruxelles, Belgique
0h10min	Paul Boulangerie - Rue de l'Enseignement 2, 1000 Bruxelles, Belgique	1	BXL Chocolates - Rue de l'Homme Chrétien 1, 1000 Bruxelles, Belgique
0h10min	BXL Chocolates - Rue de l'Homme Chrétien 1, 1000 Bruxelles, Belgique		Selecto Restaurant - Rue de Flandre, 1000 Bruxelles, Belgique
0h14min	Selecto Restaurant - Rue de Flandre, 1000 Bruxelles, Belgique	50%	Paul Boulangerie - Rue de l'Enseignement 2, 1000 Bruxelles, Belgique
0h31min	Paul Boulangerie - Rue de l'Enseignement 2, 1000 Bruxelles, Belgique	40%	Waterloo - Waterloo, Wallonie, Belgique

Total: 2h29min

LL3 SUMY – Configuring Cost Allocation per Shipper

Select the weights for the cost calculation

Volume	25
Service Points	25
Synergies of the route	50

Allocate Costs

Cost Per Shipper

Total Cost: 696.93 €

Shipper	Cost
Ocean Marée	499.66 €
Paul Boulangerie	197.27 €

Living Lab 3

SARMED

LL3 SARMED – Scope

Use Case 1 & 2 - Collaborative information sharing & Optimized RA deliveries

Business Problems

- **Information of goods** that are shipped through Regional Agencies lacks consistency and is not timely delivered.
- The client-assignor, the LSP-shipper and the End customer-receiver do not have prompt information for shipment
- Limited and late awareness for both RAs as well as LSPs of preferred delivery dates per final point, and low to none **capability to influence the delivery dates** in an efficient way.

SELIS Solution

- **Information** fed from **all Supply Chain stakeholders to the SCN** seamlessly transformed and integrated, to formalize the accurate real-time **awareness** of the current delivery status.
- **Collaborative planning** and **value sharing** through an SCN-facilitated negotiation on transport-price and delivery date among the Regional Agent and the LSP

LL3 SARMED – Achievements & Impact

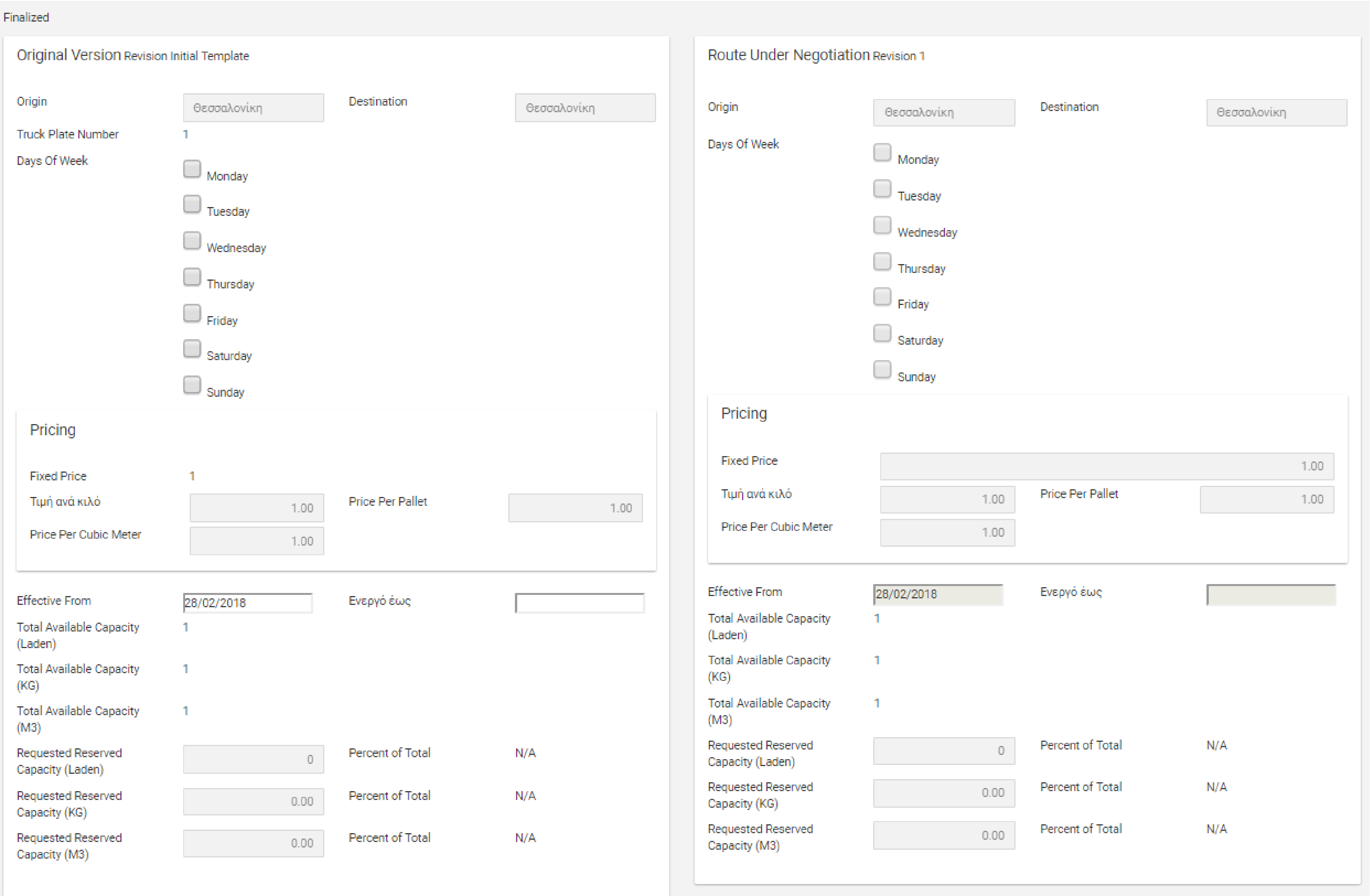
Major Achievements

- **Adapter** implemented to pull information from SARMED's WMS system
- **Visibility Dashboard** Prototype
- **Real-time Monitoring** Dashboard
- **Negotiation Workflow** Prototype
- Enhance prototype usability functionality based on user feedback
- **Implemented KPIs** Monitoring
- KPIs **Dashboards**
- Tested Workflow and Negotiation process in production environment

Business Impact

- 30% reduced information delivery lead time
- Over 30% less man-effort for trucking deliveries
- >8% reduction of operational costs
- >7% Improved **Load Factor**
- 5% Reduction on **travel distance** to collect
- Reduce delivery points per truck 10%
- 10% reduction of CO_2 footprint

LL3 SARMED – Collaborative Planning Negotiation



Living Lab 3

ZANARDO

LL3 Zanardo - Scope

UC1 – Information Sharing & Capacity Optimization

Business Problem(s)

- Lack of **visibility** of transport operations and **unused capacity**, resulting in underutilized resources and increased operational costs.
- Lack of real-time shared information about the delivery status and **available truck capacity**, resulting in waste of loading/unloading related resources and delays.

Envisioned Solution

- Created an **Information Sharing Hub** consolidating information flows from multiple systems aiming to **streamline management of truck capacity**, warehouse working processes, shipments status and **trip planning**
- Integrated trips real time data, warehouse working processes, shipments status and trip planning/ schedules.

LL3 Zanardo – Achievements & Impact

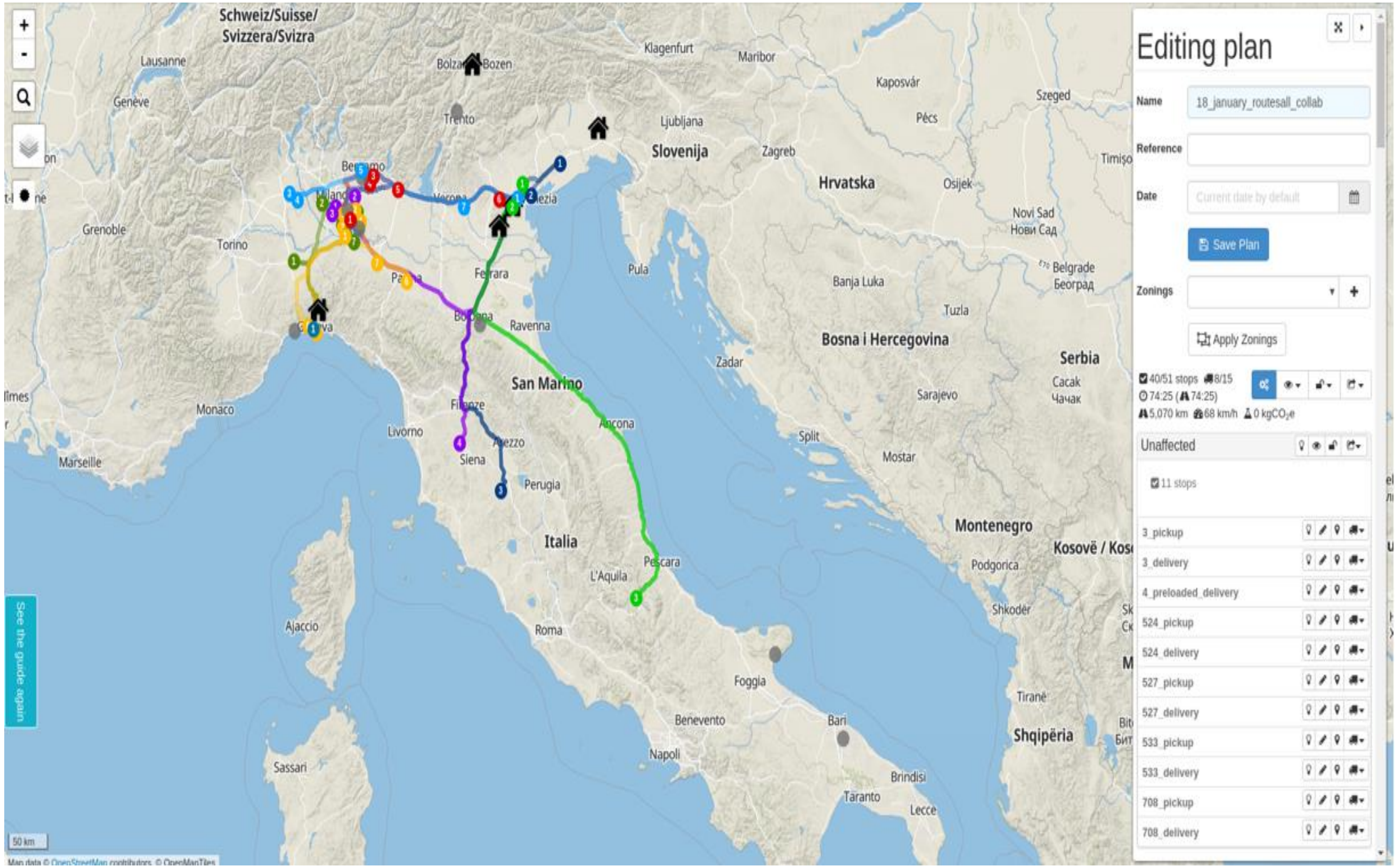
Major Achievements

- **Adaptor** designed to pull information from Zanardo's **WMS** system
- Successfully tested the requirement to load/unload the truck in less than 2 hours
- Implemented Data Workflows for the KPIs
- KPIs Dashboard prototype
- Urban Logistics Transport **Demand/Supply mapping and Global Optimization**

Business Impact

- **Improved visibility of unused capacity** and cost efficient transport operations and warehouse management
- KPI improvements
  - 15% **increase in Load Factor**,
  - 15% reduce in warehousing handling times and
  - >15% decrease in CO_2 emissions

LL3 Zanardo – Route Optimization Total Collaboration



Towards a Shared European Logistics Intelligent Information Space

Living Lab 4

ISL

LL4 ISL - Scope

Use Case 1, 2 & 3 – Visibility Services, Dashboard & KPIs, Optimized Capacity Planning

Business Problem(s)

- Actual or perceived lack of **operational reliability** for **Inland Water Transports (IWT)**
- **No integration** with external systems generating relevant logistics events, **limiting end-to-end visibility**
- **Sub-optimal capacity utilisation** and **labour-intensive manual planning** activities due to unreliable or uncertain planning constraints, both in terms of **transport volumes** and in terms of **operational issues**

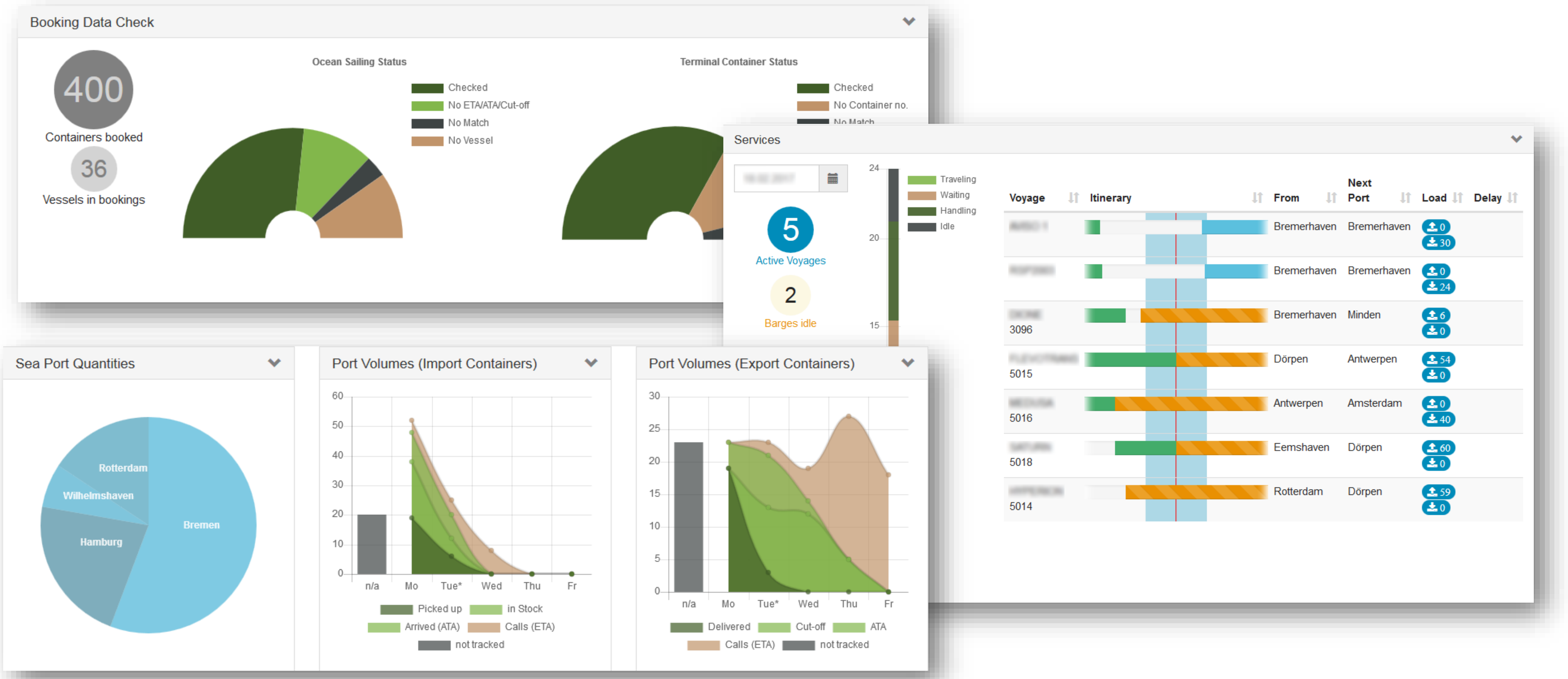
SELIS Solution

- **SC Visibility services** to enable cooperative solutions, utilizing
  - Status of container bookings
  - Deep-sea data, vessel schedules, container availability, and handling status
- A **Dashboard** build on top of the visibility services and data fed by external information sources, providing real-time KPIs and **operational status overview**
- An **Advanced Capacity Planning tool** providing feasible alternatives based on time and capacity constraints

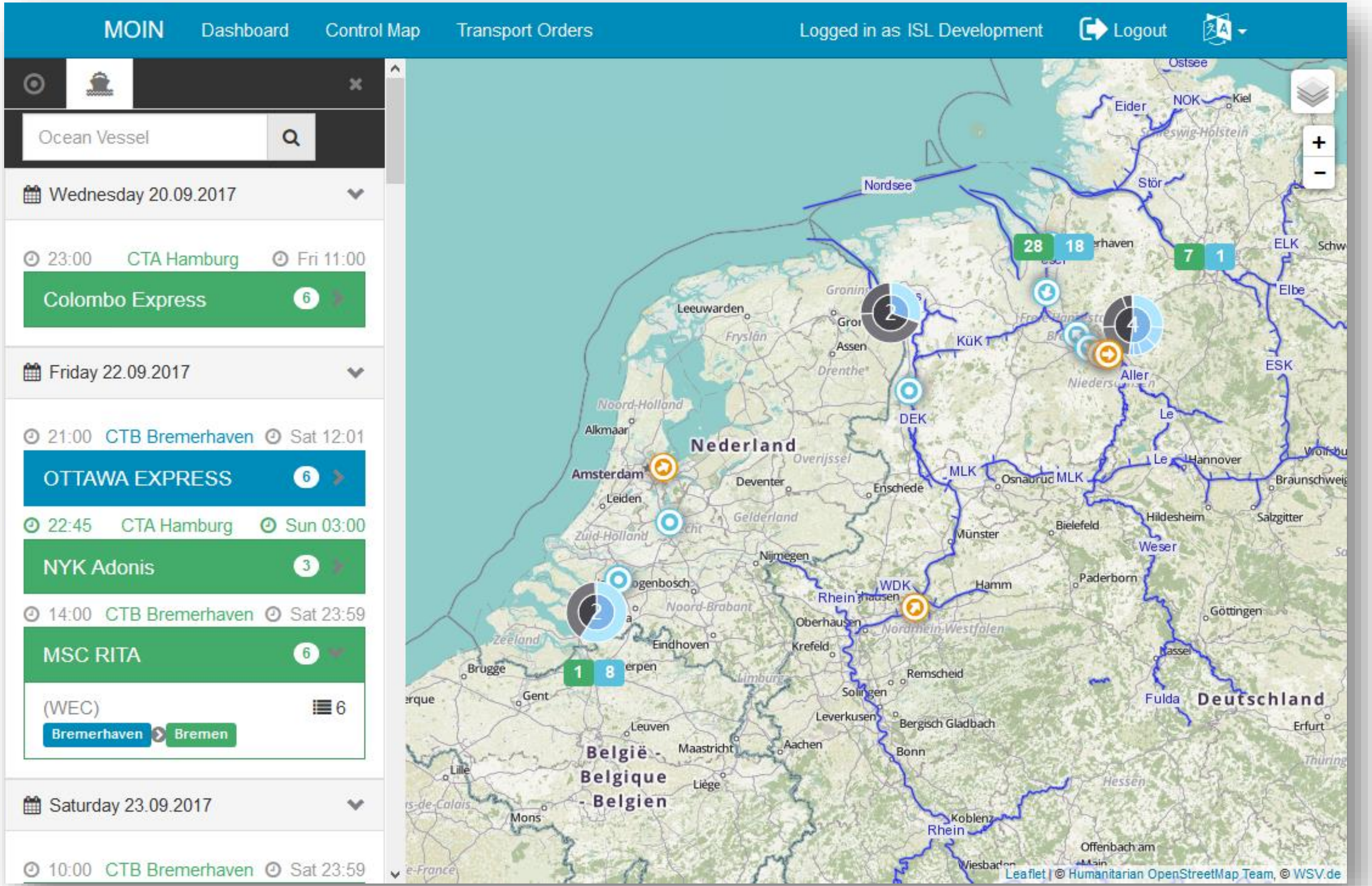
LL4 ISL – Achievements & Impact

Major Achievements	Business Impact
• **3 independent SCN Data Services** (linked to existing TMS) for Barge position, Vessel Sailing status and Container status • Integration of data services with LL-Applications • Implemented **adapters** to legacy systems to allow access to transport order data and planning data • **Dashboard to monitor data quality, coverage and forecast or transport volumes** • Visibility functions and API for customers and terminal operators • **Applied Connectivity Infrastructure** • **Capacity Planning & Forecasting of transport volumes** • Real **CO2 emissions calculation**	• **Optimization of planning** & operational processes • **Increase of capacity use** through improved planning capabilities • Cost & **CO2 reduction** • Increase competitiveness • Effective and efficient monitoring and better control of capacity utilization of all IWT services and quality measures • Automatic, fast and effortless **calculation of available options** • **Modal shift promoted**

LL4 ISL - Visibility Platform (Dashboard Perspective)



LL4 ISL – Control Map with geo-fenced information (Planning Perspective)



Living Lab 5

Adria Kombi

LL5 AK - Scope

Use Case 1&2

Business Problem(s)

- **Time consuming, manual** process for collecting and **broadcasting** Container status to involved stakeholders
- **Hard to predict delays** in rail transport, their **impact** to overall wagon-set planning, and propose alternative wagon-set utilization when a delay is materialized

Envisioned Solution

Consolidate container status information (such as container location and **ETA to final destination**) from multiple sources and "publish" to the appropriate channels (either **via P/S** Communication Infrastructure, or through a simple web-interface using the unique container id)

Propose optimized wagon-set utliziation, based on ETA predictions

LL5 AK – Achievements & Impact

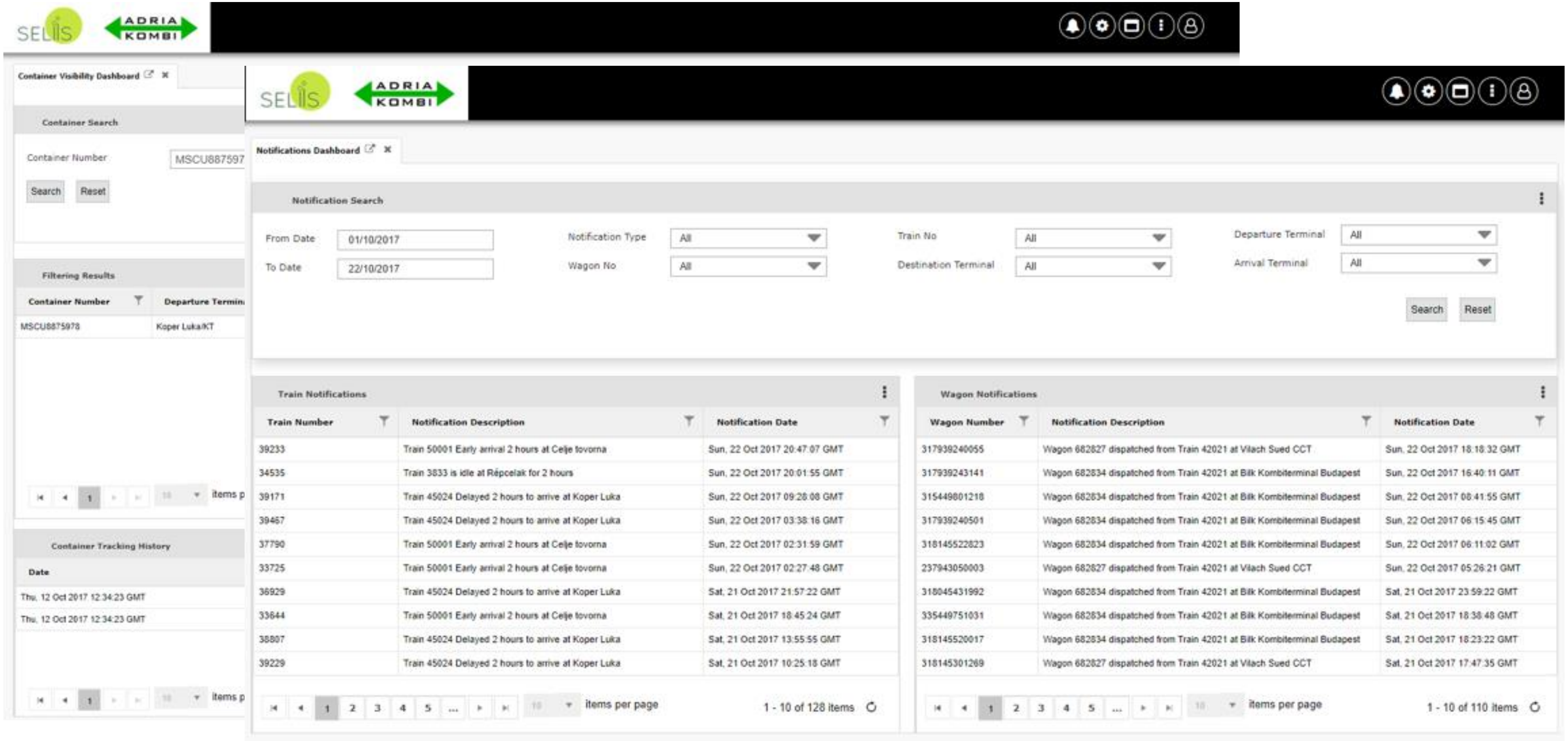
Major Achievements

- "**Container Visibility Dashboard**" portal implemented, consolidating and visualizing container data (ETA, delays, CO_2 reduction) from multiple sources.
- **Communication between AK Legacy systems and the SCN** through RESTful APIs, and defined the XML structure of the exchanged message.
- "**Notifications Service**" implemented to provided custom notifications of transport events or irregularities
- **Multiple transport legs ETA Calculation** and the respective GUI
- Implementation of **KPIs Montoring Dashboard**
- **Wagon-set proposed corrective actions mechanisms** when disrupting incidents occur

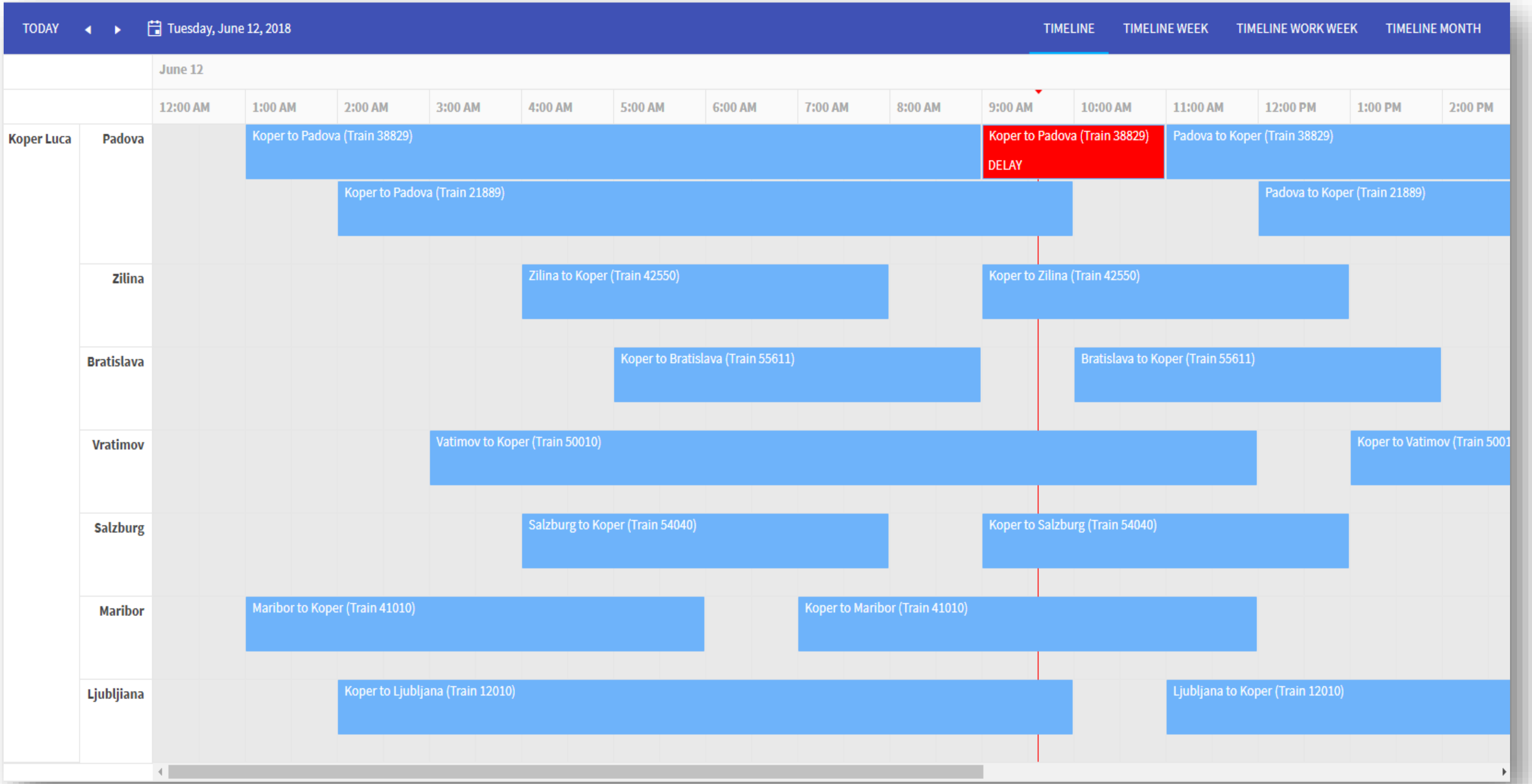
Business Impact

- Minimized manual communication overhead to keep business partners updated
- Reduced planning effort and time by minimum 10%
- **Optimized wagon-set utilization** by 15%, reduced delays at terminals by 10%, reduce CO2 emmissions by 10-20% due to modal shift

LL5 AK - Search & Notifications Front End



LL5 AK – Rescheduling



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Living Lab 6

MARINETRAFFIC & DFDS

LL6 DFDS - Scope

Use Case

Business Problem

- **Lack of visibility, during maritime transport** – hindering collaborative planning
- Inaccurate Time of Arrival of ships
- Inadequate communication infrastructure to facilitate ship-port-trucks synchronization

Envisioned Solution

- Provided **algorithms**, implemented as SCN recipes, for calculating updated ETAs based on real time ship-location data
- Constructed SCN Shipping Services to support Supply Chain Actors synchronization

LL6 DFDS – Achievements & Impact

Major Achievements

- **Accurate ships ETA Calculation** on the SCN based on **real time AIS data**
- **Shipping services Community Node** supporting a standard process for Ship-port-trucks synchronization
- **Interfaced with external data sources and third party data providers**.
- **Synchronization model** based on an SCN built **Knowledge Graph**, with key information entities of the Common Information Exchange Model mapped to the data models of enterprise systems

Business Impact

- **Maximized operational efficiency** and environmental performance for door to door services.
- Increased visibility of shipments to facilitate more collaborative planning.
- Enabled the end customer **track the status of an entire shipment** (including land and maritime legs)

Living Lab 7

CONEX

LL7 Conex - Scope

Standardising SC data, creating **Pipeline Data Exchange Structures** and demonstrating their uses

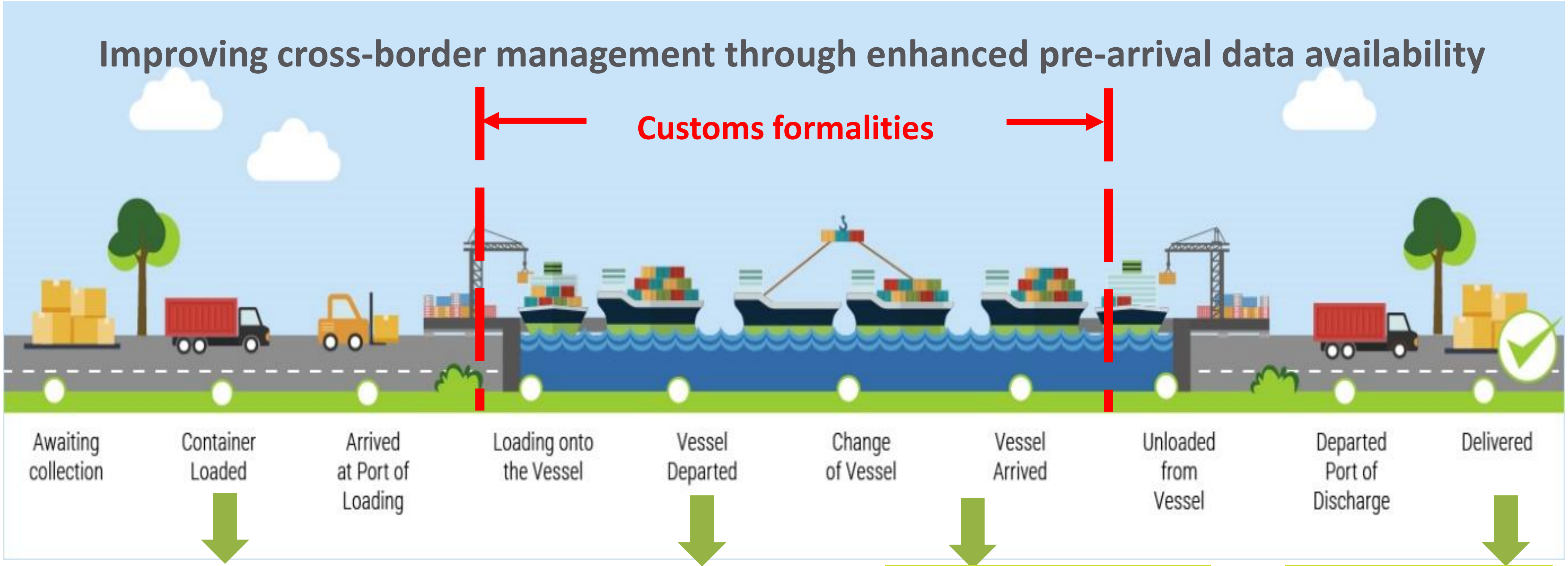
Business Problem(s)

- **Data** sent to **cross-border agencies** for goods entering a new customs territory is often of **low quality** or **incomplete** as it is not always provided by the original data source, or is received **too late** for agencies to carry out effective or **timely risk analysis**. This leads to:
  - consignments being **unnecessarily inspected**,
  - monopolizing cross-border agency resources needlessly
  - significantly **slowing down** the movement of legitimate trade
  - lack of visibility leading to increased risk and cost for the importer

Envisioned Solution

- Explore the concept of **Pipeline Data Exchange Structures** (**PDES**) and the extraction and transmission of **standardized data** in the context of cross-border movements and regulatory compliance, utilizing global **standards** such as **UN/CEFACT Reference Data Models**.
- **Decision Support System** (**DSS**) with **risk indications** and suggestions
- Multiple-filing: data provided by original sources enabling increased data quality and consistency

LL7 Conex – Waypoint Data



Waypoint 1

Parties
- Buyer
- Seller
- Loading Party
- Ship To

Goods
- No. of Packages
- Country of Origin
- HS Code
- Value of Goods
- Description of Goods

Container Details
- Container and Seal No

Waypoint 2

Parties
- Carrier
- Planned Delivery

Goods
- Country of Export
- Country of Destination

References
- Master Bill Number

Waypoint 3

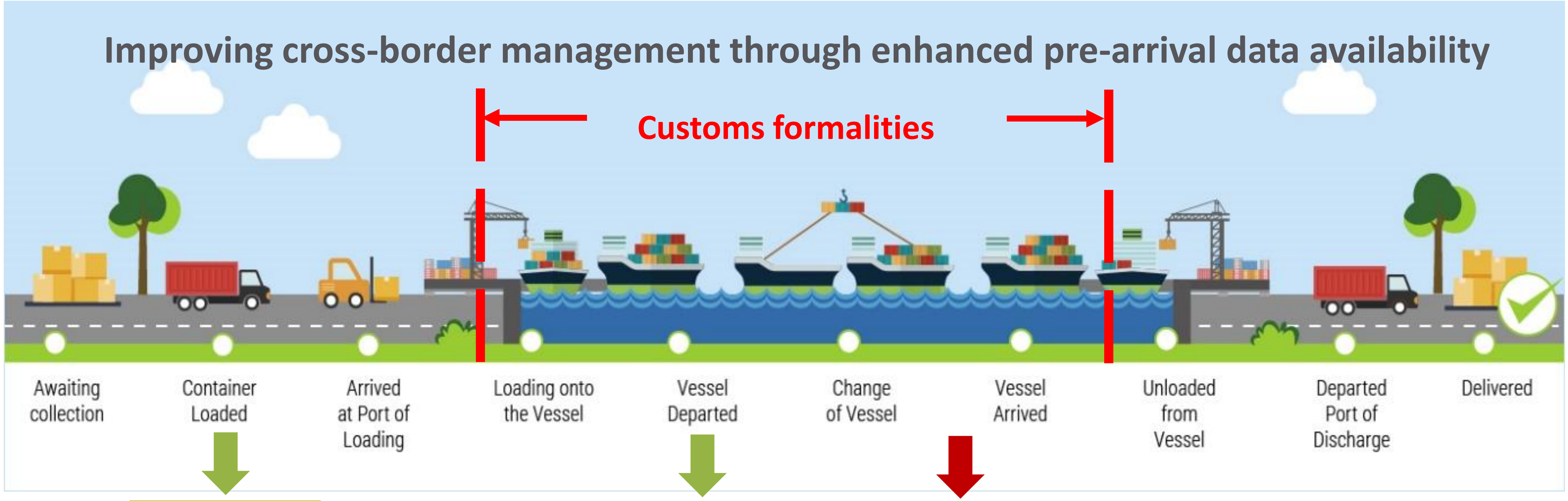
Routing
- Port Call(s)
- Port of Entry to EU / UK
- Estimated Arrival Date
- Arrival Location

Waypoint 4

Parties
- Actual Delivery Date

Goods
- No. of Packages
- Declared Amounts (if different)

LL7 Conex - Demonstrator 1



Waypoint 1

Waypoint 2

Manifest

Pipeline Data

- Available up to 30 days earlier
- Accurate, as originates directly from supply chain
- Complete, containing commercial sales contract data:
  - Buyer
  - Seller
  - HS Code
  - Country of Origin
  - Goods description

Versus

Manifest Data

- Available late - maximum 48 hours pre arrival
- Poor quality data as often "diluted" due to
  - work load constraints,
  - insurance needs
  - commercial sensitivity issues
- Missing key data for effective risk analysis

LL7 Conex – Achievements & Impact

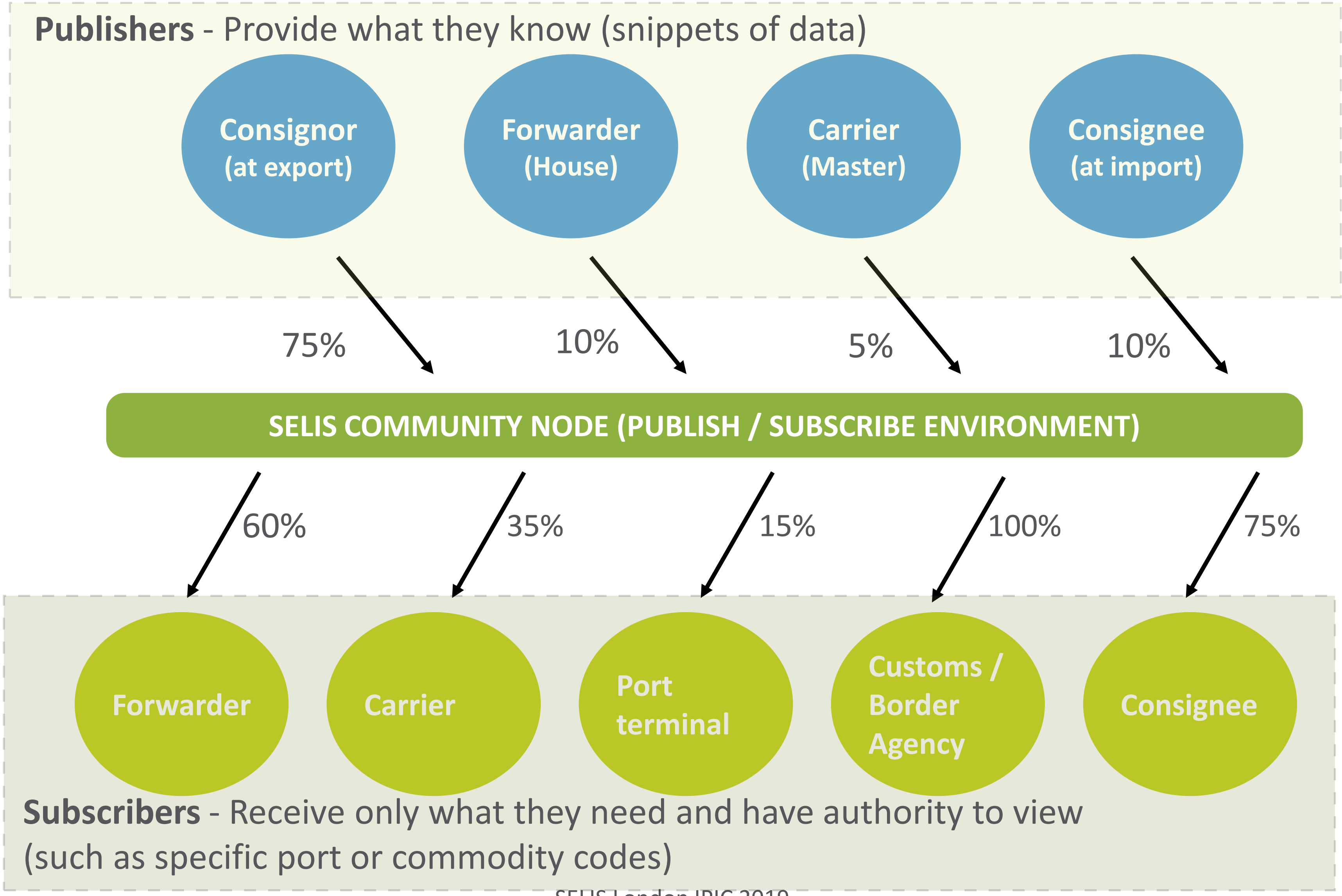
Major Achievements

- Identification of **required data elements** per scenario and **per Waypoint** and definition of **information flows**
- Investigated **risk analysis engine** interaction and additional dashboard requirements
- **KPI Dashboard** (based on Data Analytics)
- Established **SCN Data Repositories**
- **Pipeline Data Exchange Structure** extraction creation and mapping
- **Risk Analysis Engine** Prototype tested with data and rules
- Positive feedback from cross-border agencies

Business Impact

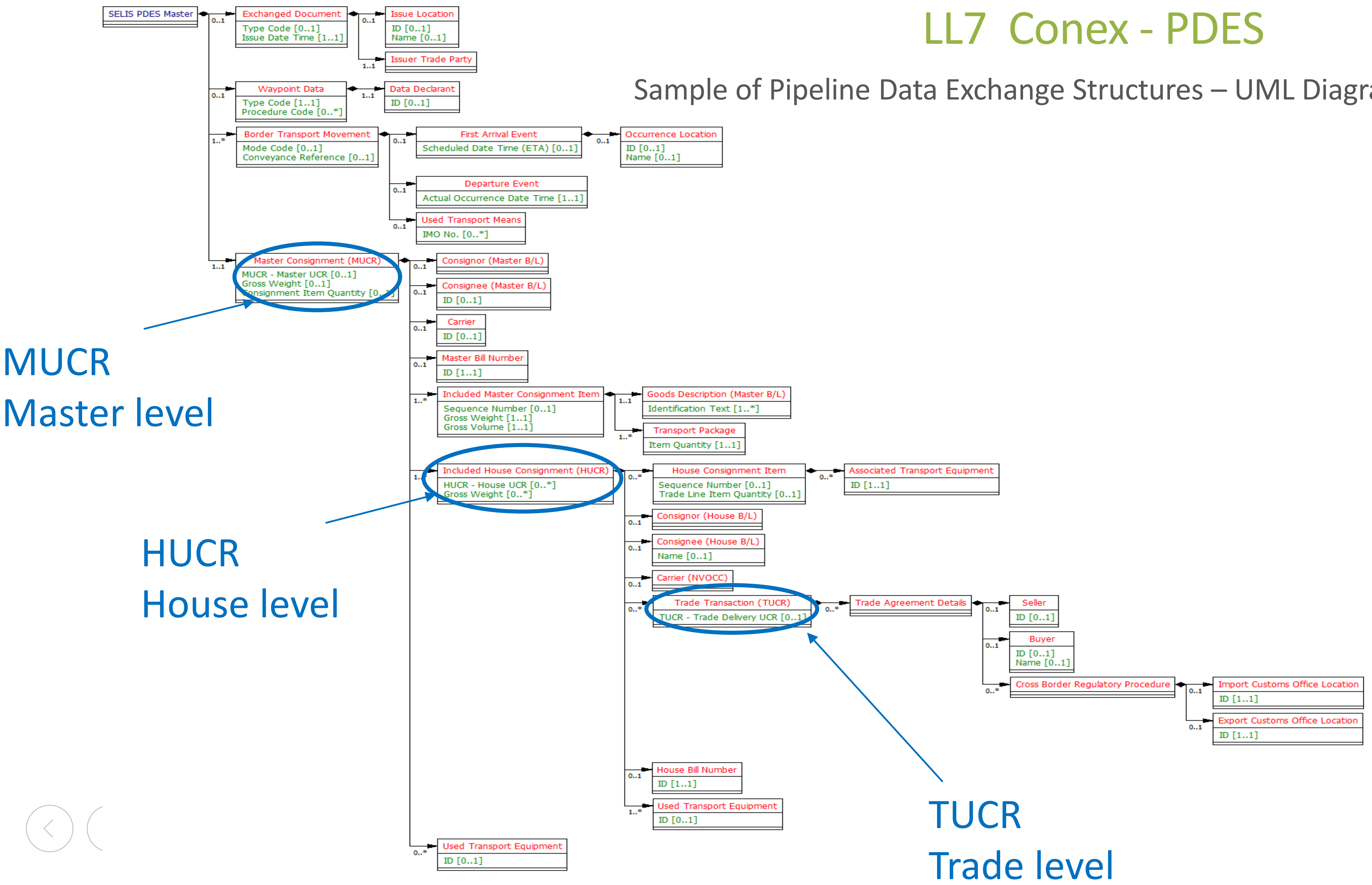
- More **accurate cross-border control decisions**, minimizing unnecessary inspections
- More **fluid cross-border movements** for legitimate trade, increasing transparency and reducing delays
- Greater **ETA-ATA visibility**
- Optimization of time and costs related to cross-border control and inspection planning
- Timely identification of reliable transport means and carriers

SCN Publishers & Subscribers



LL7 Conex - PDES

Sample of Pipeline Data Exchange Structures – UML Diagram with use of UCRs



LL7 Decision Support System

Comparison of two instances of Advance Security Declarations (ENS) at two Waypoints

Waypoint Visibility

Customs - Way Points

Waypoint	DateTime	Locat...	ShippingAg...	TotalConsignm...	DirectConsignm...	TranshipmentConsignm...	TotalEquipeme...	FullEquipeme...	EmptyEquipeme...
WP2-ARNICS	Fri, 18 Jan 2019 09:48:10 GMT	FRMRS	MONT VENTOUX	20	20	0	40	30	10

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Customs - Way Point Risks

Consignment	CargoId	RiskTypeId	RiskScore	Severity	Details	Suggestions
TNTUN1501181	MFTU1234567	DOCUMENT	2.3	HIGH	Invalid Date	DOCUMENT CORRECTION

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SELIS Towards a Shared European Logistics Intelligent Information Space

Living Lab 8

ELGEKA

Living Lab 8 Scope

ELGEKA Use Cases

Business Problems

- **Limited visibility on the delivery status** of the orders.
- Expected Time of Arrivals (**ETA**) not updated
- High **Cost for obtaining Working Capital** (situation further affected by the economic crisis)
- Risk of uncollectable transactions

SELIS Solution

- A SCN-based solution that enables **SC visibility and collaboration** for the entire supply chain, facilitating orders accessing and tracking without manual effort
- SCN calculated **Supply Chain Excellency Score** utilizing SC Visibility to support the assessment of the financial risk from buying receivables from a supplier
- **SC Financing solution** to facilitate the selling of supplier’s receivables to financial investors

LL8 ELGEKA – Achievements & Impact

Major Achievements

- **SCN-facilitated workflows**:
  - Electronical receipt of Delivery Notes
  - Automated PoD from End customer
  - SC excellency score required Data
- **SC Excellency Score calculation recipe** through SCN Big Data analytics on SCV data
- **Granted SC excellency Score Patent**
- Engaged Financial Institutions as prospect users

Business Impact

- **Increased Visibility**
- Reduced lead time
- Reduced stock outs
- **Reduced operational cost for information exchange**
- Lowered CO_2 emissions (15-30%)
- Improved transportation agility
- Reduced transportation cost
- **Lowered Working Capital cost** for ELGEKA
- Better credit rating with less costs in the supply chain
- Improved ELGEKAs relationship with own customer

Living Lab 8 Scope

SONAE Use Case

Business Problems	SELIS Solution
• **Little or no visibility** and collaboration between Sonae and its suppliers, companies work in silos – severe for SME's • This is a widespread challenge within the food retail sector • **Sub-optimal Supply Chains** due to "guessing" that leads to significant buffering • Highly **complex challenges of privacy**, sensible information, and competitors positioning • +1Bn€ Orders, +50K SKU's, +10K Suppliers • **Open-book business processes non-existent**	• A **third-party independent platform**, where conditions are right for **sharing information** from all parties • Sonae and suppliers **share sensible data to the SELIS Community Node & Ecosystem** • **Algorithms identify/predict alarming situations** of under and of overstocking • Value-added actions are taken in **an iterative workflow** • **One-stop-shop for SME's Supply Chain Collaboration** • **Network effects apply** for reaching the market

LL8 SONAE – Achievements & Impact

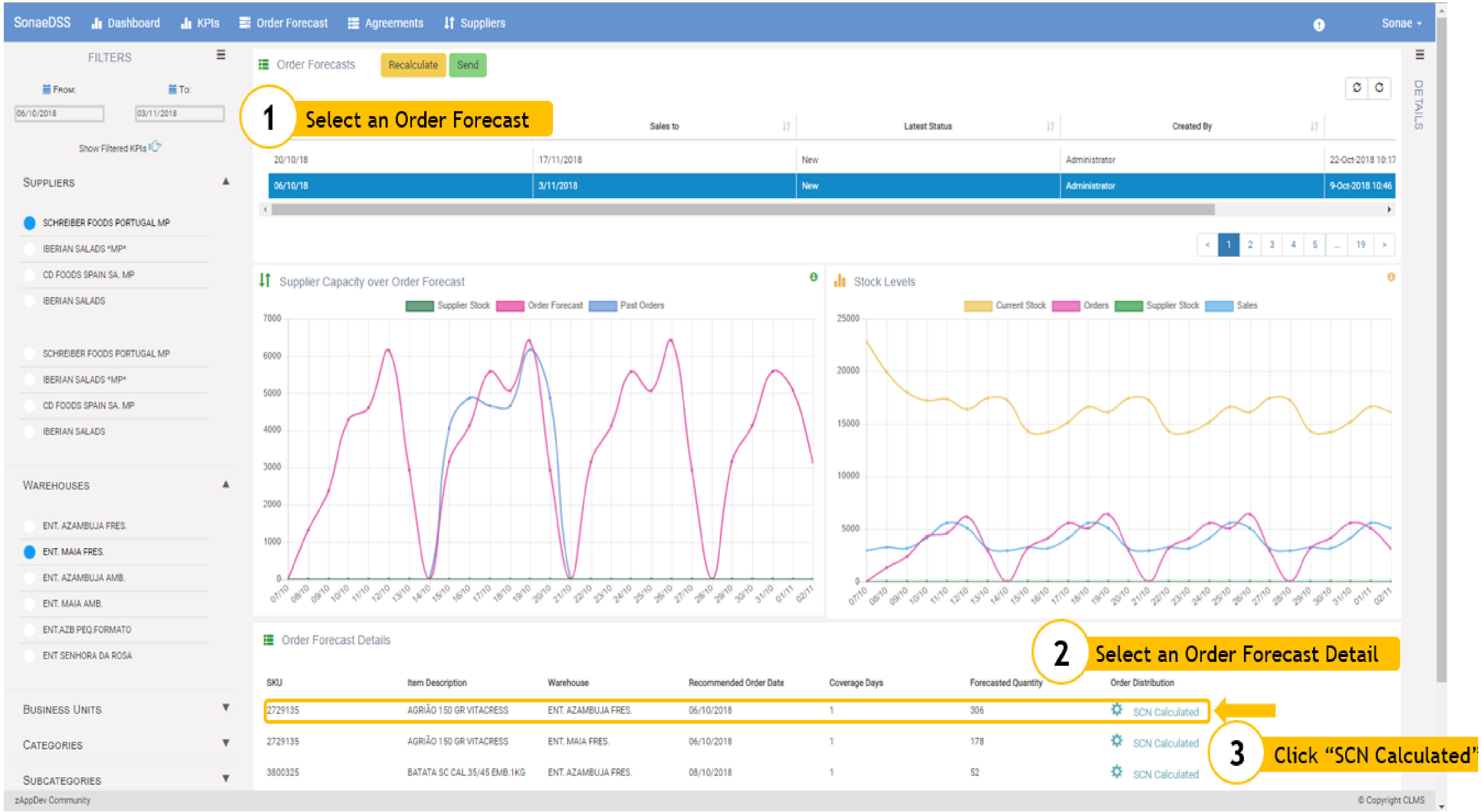
Major Achievements

- **SCN-facilitated workflows**
  - Forecasted Orders to Supplier
  - Suppliers Stock Availability
- SCN **Transformation of forecasted sales to orders**
- **Dashboard for 1-2-1** visibility and collaboration, with implemented workflows
- **Simulation environment & models for a many-2-many** scenario of multiple stakeholders

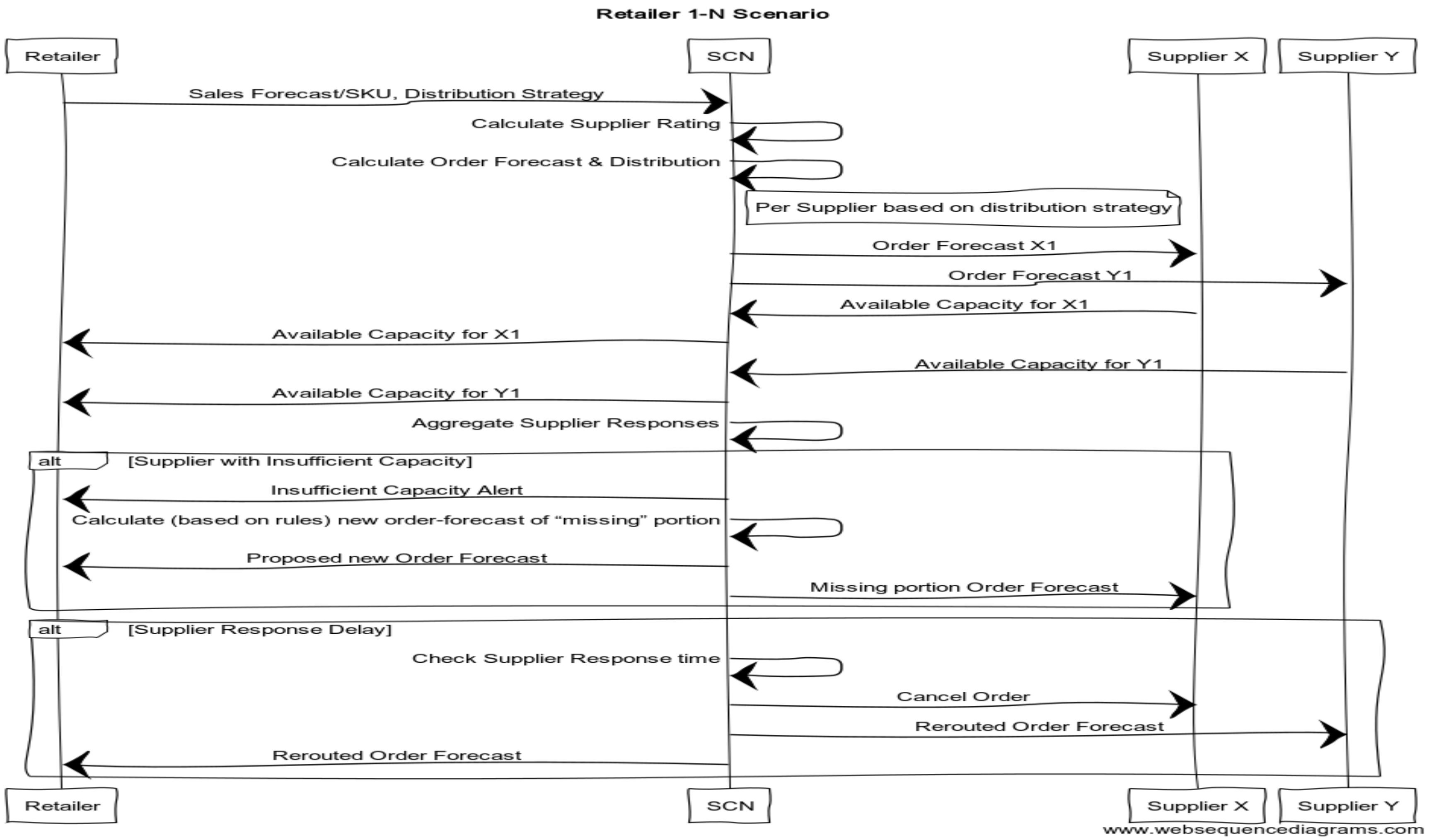
Business Impact

- **Minimized stock-outs**
- **Decreased production costs by levelling production and demand**
- Increased supply chain agility due to common planning
- Created a greener supply chain by decreasing waste
- **Strengthened the relationships** among producers, suppliers, and retailers

LL8 SONAE – Order Forecast



LL8 SONAE – One Retailer to Many Suppliers via SCN



Q&A

The project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under the Grant Agreement No 690588