LOGISTAR

Users'/Advisory Board Webinar

9th December 2020

Agenda

10:00 – 10:05	Welcome and introductions
10:05 – 10:15	Overview of the LOGISTAR project (Deusto)
10:15 – 10:35	Outcomes from the strategic analysis in horizontal collaboration (Preston & Ahlers)
10:35 – 10:45	Business models (MDS Transmodal)
10:45 – 11:10	Progress in the LOGISTAR system (Software AG, DbH & Genegis)
11:10 – 11:45	Overview of the 3 Living Labs by the stakeholders (Nestle & pladis, Codognotto , Chep and Ahlers)
11:45 – 12:00	Final discussion, closure and next steps

LOGISTAR

PROJECT OVERVIEW

LOGISTAR - Enhanced data management techniques for real time logistics planning and scheduling

About LOGISTAR

Consortium of **15 partners**, coordinated by the University of Deusto (Spain)

- Budget: **4.997.548,75 €**
- Duration: **40 months** (until September 2021)

Project managed by INEA agency - Innovation and Networks Executive Agency (European Commission)

Project funded by H2020:

- Work programme: **Smart, green and integrated transport**
- Call: MG-5.2-2017: **Innovative ICT solutions for future logistics operations**

LOGISTAR overall concept

Effective planning and optimization of transport operations

- Horizontal collaboration
- Real time available data

CONTROL AND DECISION-MAKING TOOL

- **Integral visibility and planning of resources**
- **Planning of dynamic routing**

→

- Optimized planning of resources
- Optimal routes for deliveries
- Identification of events
- Dynamic planning reconfiguration
- Horizontal/vertical collaboration
- Multimodal management

REAL-TIME INFORMATION ON FREIGHT TRANSPORT

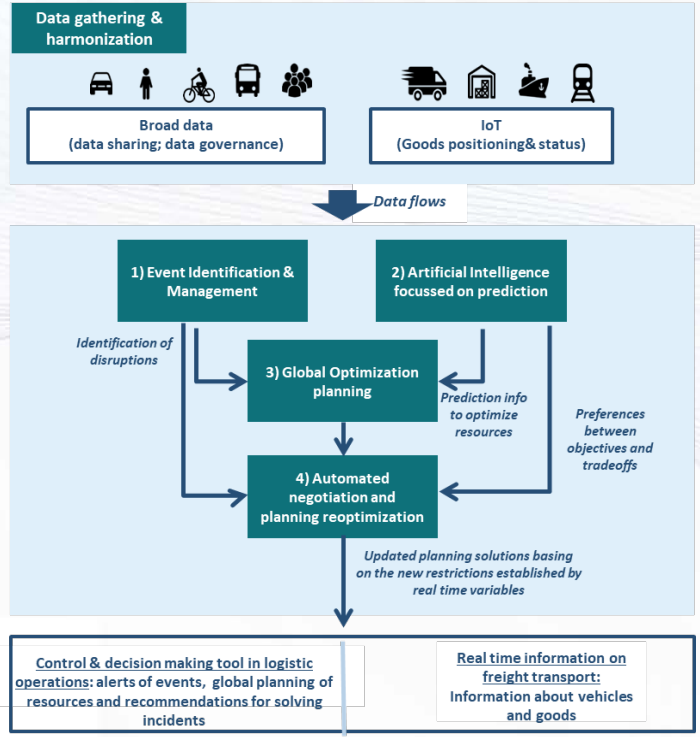
→

KPIs of real time logistics

- *Position of goods*
- *Operational status*
- *Working conditions*
- *Arrival times*
- *Environmental conditions*

LOGISTAR overall concept

- To **leverage the available data**, to process it and **to deliver services**
  - Data will be retrieved and harmonized
  - Sensors will be connected to a cloud IoT platform
- Information used by **smart algorithms for**
  - Predictions
  - Learning the preferences
  - Optimization of the planning of operations
  - Automated negotiation and re-optimization
- **Real-time dashboards** which will provide an overview to managers of what is happening



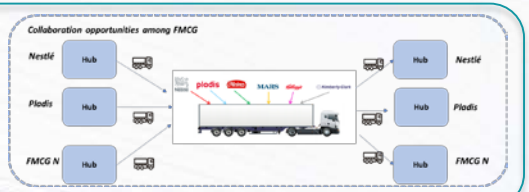
Key innovation aspects

- **Artificial Intelligence focused on prediction**
  - Inference based on event detection and probabilistic programming frameworks
- **Global optimization planning**
  - Realistic optimization models based on Robust and Multi-Objective Optimization.
  - Hybrid metaheuristics based on paradigms of parallel computing
- **Automated negotiation** and **planning re-optimization**
  - Constraint satisfaction problem solving techniques
- **Event Identification Rules**
  - A new application domain for the processing of complex events and their aggregation
- **Service layer – Decision making tool**
  - Increased data gathering, cleansing and structuring
- **Data gathering techniques**
  - ETL tools for Linked Data. Scraping and transforming

Living labs

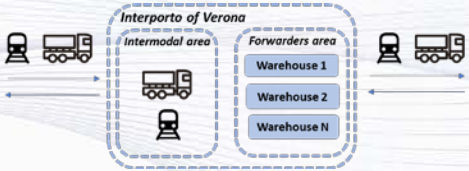
Backhauling and Co-loading

To improve backhauling management
Overall overview of the status of the operations



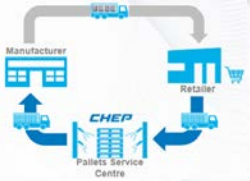
Synchromodality

Planning of multimodal routes
Real time monitoring



Dynamic Appointment Scheduling
Accurate ETA Calculation for Trucks

Reduction of waiting times at loading and unloading locations

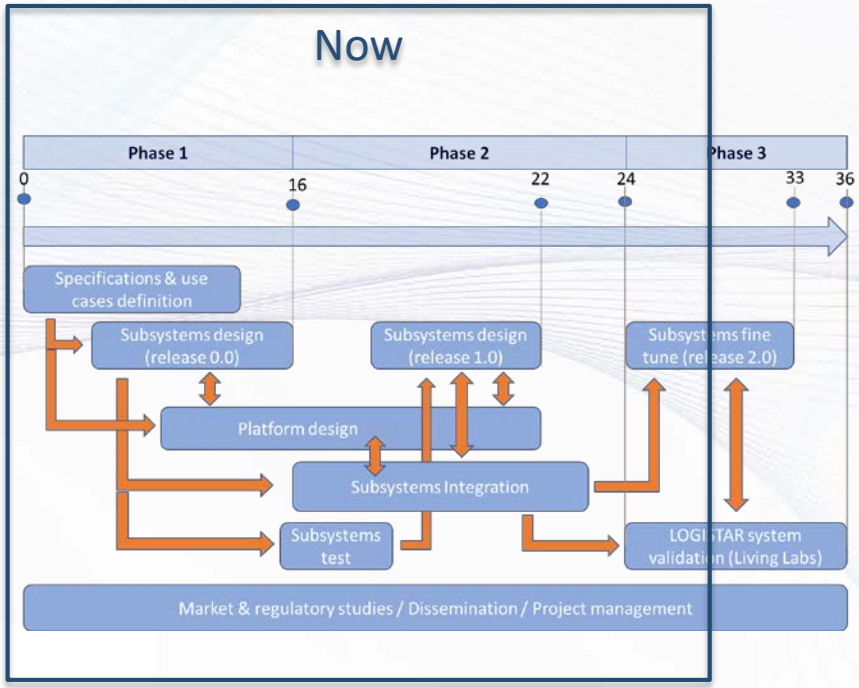


Virtual Living Lab

Based on historic data from real supply chain operations
allowing to implement stress test over the solution

Timeline

- Phase 1 [M1 – M16]
  - Specification and use cases definition
  - Subsystems & platform design
- Phase 2 [M16 – M24]
  - Platform design & Integration
  - Subsystems release 1.0
- Phase 3 [M24 – M36]
  - System validation
  - Subsystems fine tune
- All [M1 – M36]
  - Market studies
  - Dissemination
  - Management



Milestones

M8	End-users requirements MS1 - PRESTON
M12	**Data collection and metadata processing in place** MS2 - SWC
M17	**Advanced models and methods for global** optimization MS5 – DEUSTO
M18	**Technical architechture** as a blueprint for development MS10 - SAG
M20	First **versions of technical software modules developed** MS3 – UCC; MS6 – DEUSTO; MS8 - CSIC
M26	Final versions of technical software modules MS4 – UCC; MS7 – DEUSTO; MS9 - CSIC
M26	First integration of LOGISTAR PLATFORM MS11 – DBH
M26	Use case set-up MS13 – AHLERS
M33	Fully integrated LOGISTAR platform MS12 - DBH

- User needs and system requirements
- Analysis on horizontal collaboration and Regulation aspects
- Data sources and Data storage
- Events processing module
- Algorithms for prediction in logistics
- Methods for global optimization
- Re-optimization algorithms
- LOGISTAR architecture design (v1.0)
- Use cases and validation plan
- Website & dissemination material
- Business models

LOGISTAR

Partners and roles

Deusto / DeustoTech Mobility	Project Coordinator Global optimization planning techniques	dbh Logistics IT AG	Implementation and integration of services
Insight / UCC University College Cork, Ireland	Artificial Intelligence techniques focused on prediction	GENEGIS GI Geographical Intelligence	Geo-special oriented software solutions
CSIC IIIA Institut d'Investigació en Intel·ligència Artificial	Automated negotiation algorithms	ahlers	Testing and validation – Real time logistics in chemical industries use case
DUNAV NET	Cloud IoT data	Consorzio ZAILOG	Testing and validation – Multimodality use case Dissemination activities
SEMANTIC WEB COMPANY	Data gathering and harmonization	Nestlé	Testing and validation – Backhauling and co-loading use case
PS PRESTONSOLUTIONS	End-users engagement	pladis	Testing and validation – Backhauling and co-loading use case
MDS Transmodal	New and emerging business models assessment	CODOGNOTTO	Testing and validation – Multimodality use case
software AG	Predictive analysis and processing of real-time data	CHEP A Brambles Company	Testing and validation – Synchromodality use case

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LOGISTAR project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 769142.

Outcomes from the strategic analysis in horizontal collaboration

Dr Andrew Palmer - Preston Solutions Ltd
Filip Lazovic – Ahlers

Users' advisory board webinar

9th December 2020

22 companies interviewed

FMCG	Chemicals	LSP	Other
Nestle	Huntsman	Ahlers	Zailog
Pladis	Celanese	Codognotto	Chep
Kelloggs	Vynova	NFT	Toyota
Mars	Du Pont	Turners of Soham	
Kimberly Clark	Corbion	CLdN Cargo	
Asda	BP Chemicals		
Procter & Gamble			
Tesco			

Discussed

- Supply chain network
- Transport operations & systems
- KPI's

Strategic analysis - Scope

Four sectors considered

- FMCG - Flow data from 5 companies analysed
- LSP's - Flow data from 3 LSPs analysed
- Terminal Operators - Data related to 7 terminals considered
- Chemicals - Flow data from 7 companies analysed

Strategic analysis - Purpose

1. To gain an understanding of the transport operations
2. To identify any inefficiencies/anomalies
3. To identify any commercial opportunities for the companies
4. To show companies collaborative opportunities in order to encourage involvement in the LOGISTAR project
5. To identify opportunities for LOGISTAR system
6. To assess LOGISTAR's ability to find those opportunities

Software used

- Speadsheet functionality with add ins and macros
- Strategic network design interfaced to software for collaborative analyses - PSL
- BBaRT: Bundling, Backhauling, and Roundtrip Tool – Ahlers
- Llamasoft SC Guru - Ahlers
- Tableau - Ahlers

Individual company analyses

1. **Base case analysis (data manipulation)**
   - High level totals and percentages
   - Seasonality
   - Delivery & load analysis (by pallet, dels/load, delivery time accuracy)
   - Delivery & load analysis (time: by hour of the day, day of the week, day of the month, month of the year)
   - Customer pareto
   - Regional densities
   - Costs, kilometres, no of vehicles and CO2 emitted
2. **Company efficiency and opportunities**
   - Centre of gravity analyses
   - Alternative vehicle types

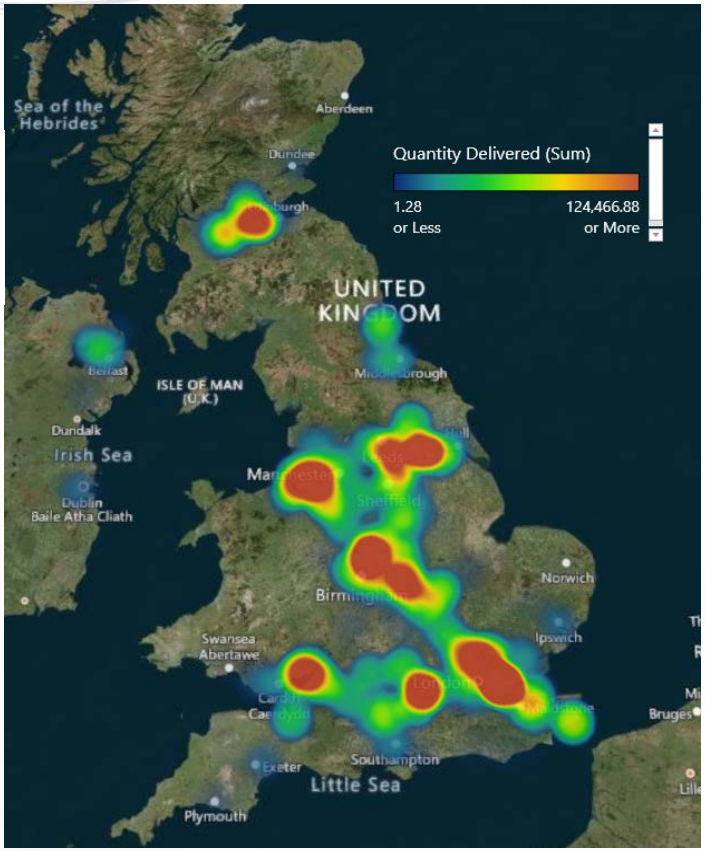
Collaborative analyses

3. Collaborative opportunities

- Backhaul opportunities
- Co-loading of small deliveries
- Consolidation of small deliveries
- Use of regional consolidation centres
- Use of urban consolidation centres
- Logistics clusters
- Multi modal opportunities

FMCG 5 company base case analysis

Heat map of pallets delivered



	Number of Source/Dest.	Number of Movements	Quantity Moved	Total Cost	Total Distance	Total Hours	No. of Vehicles	Tonnes of CO2
Delivery	5,494	617,940	11,548,539	£187,134,133	178,537,762	3,440,069	766	170,213
Supply	459	84,271	2,088,944	£30,140,992	29,160,138	554,314	123	27,801
Total	**5,953**	**702,211**	**13,637,483**	**£217,275,125**	**207,697,900**	**3,994,384**	**889**	**198,013**

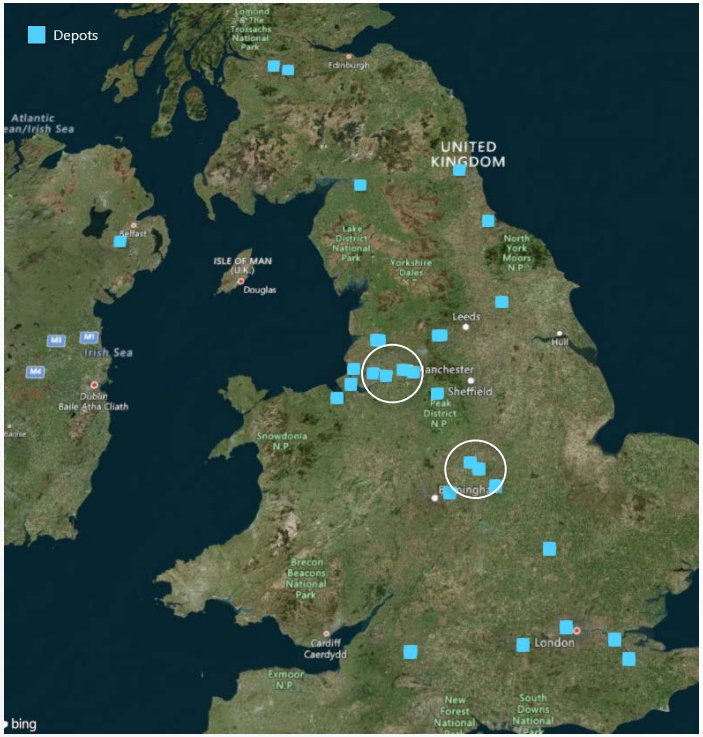
Backhauling

	No of Flows	Cost saving over 2 way	Km saving over 2 way	Tns CO2 saving over 2 way	
5 companies	67	40.0%	42.6%	42.6%	of all i/c collab movements
	5657	3.3%	3.3%	3.4%	of all flows
	844	7.1%	7.0%	7.5%	of all EL movements

Match criteria

- Maximum offset distance of 50% of journey length or 100km
- Next day return journey time must exceed 20% of available duty time
- Journey length must be greater than 15km
- At least 52 empty leg movements per year

Co-loading

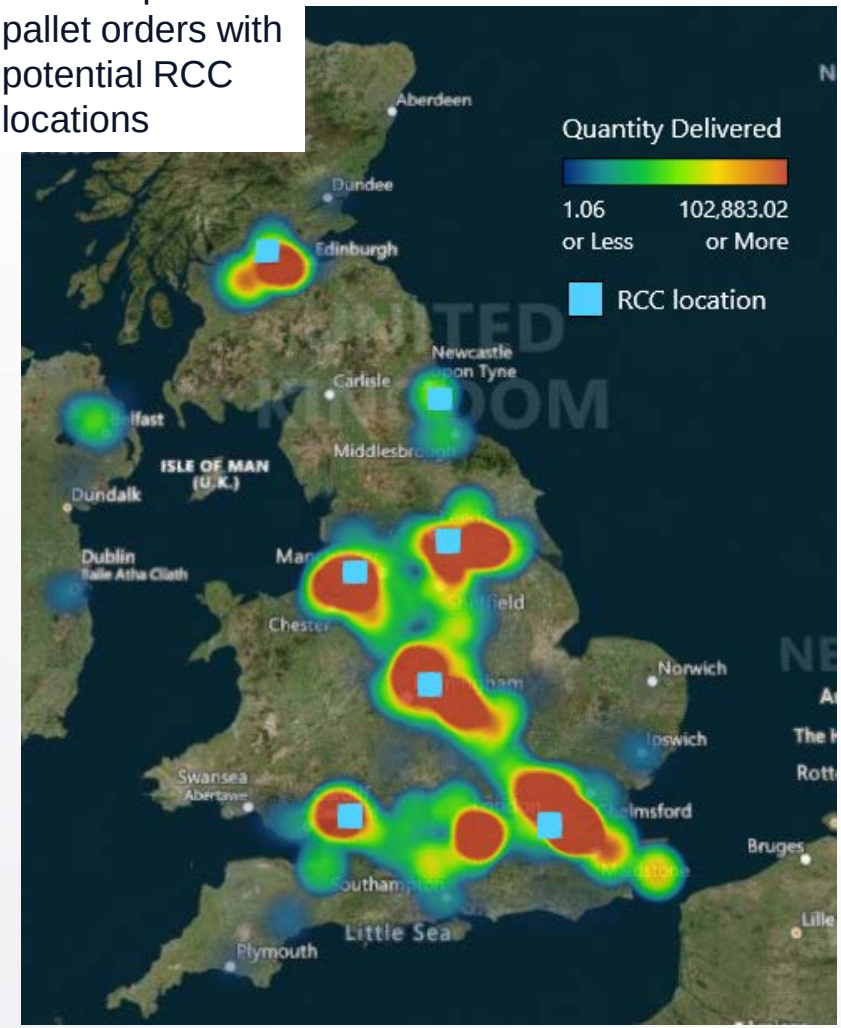


- LTL classified as less than 60% of FTL
- Locations of depots with sufficient quantity of LTL orders.
- Can be considered for co-loading.
- Depots situated in North West and Midlands look promising but customers need to be sufficiently far away to show cost savings

LTL only from selected depots	Base case cost	Cost with co-loading	Cost saving	% saving
Company A	£152,032	£106,702	£45,330	30%
Company B	£2,697,786	£1,859,288	£838,498	31%
Company C	£2,384,413	£1,465,579	£918,834	39%
Company D	£281,382	£196,670	£84,713	30%
Total	**£5,515,613**	**£3,628,238**	**£1,887,374**	**34%**

Regional consolidation centres

Heat map of LTL pallet orders with potential RCC locations

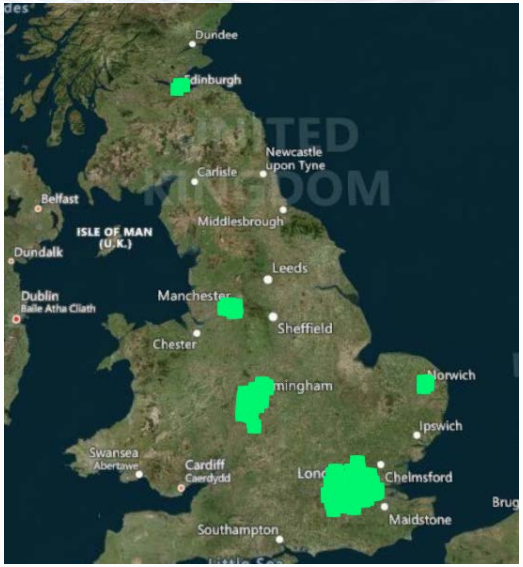


	Quantity moved	LTL cost	Kms travelled
Base case	2,231,645	£77,425,745	78,852,119

	Cost saving (£)	% saved	Km saving	% saved
Company A	£7,082,384	30%	11,033,246	44%
Company B	£8,111,912	45%	11,879,794	60%
Company C	£3,553,341	24%	6,469,254	44%
Company D	£2,567,400	22%	5,278,284	45%
Company E	-£56,066	-1%	1,158,939	15%
Total	£21,258,970	27%	35,819,516	45%

- Savings based on LTL movements only
- 4 of the 5 FMCG companies benefited under this scenario
- Company E did see a reduction in kilometres.
- Companies A and B received the greatest benefit.
- Does not include the cost of RCC's

Urban consolidation centres

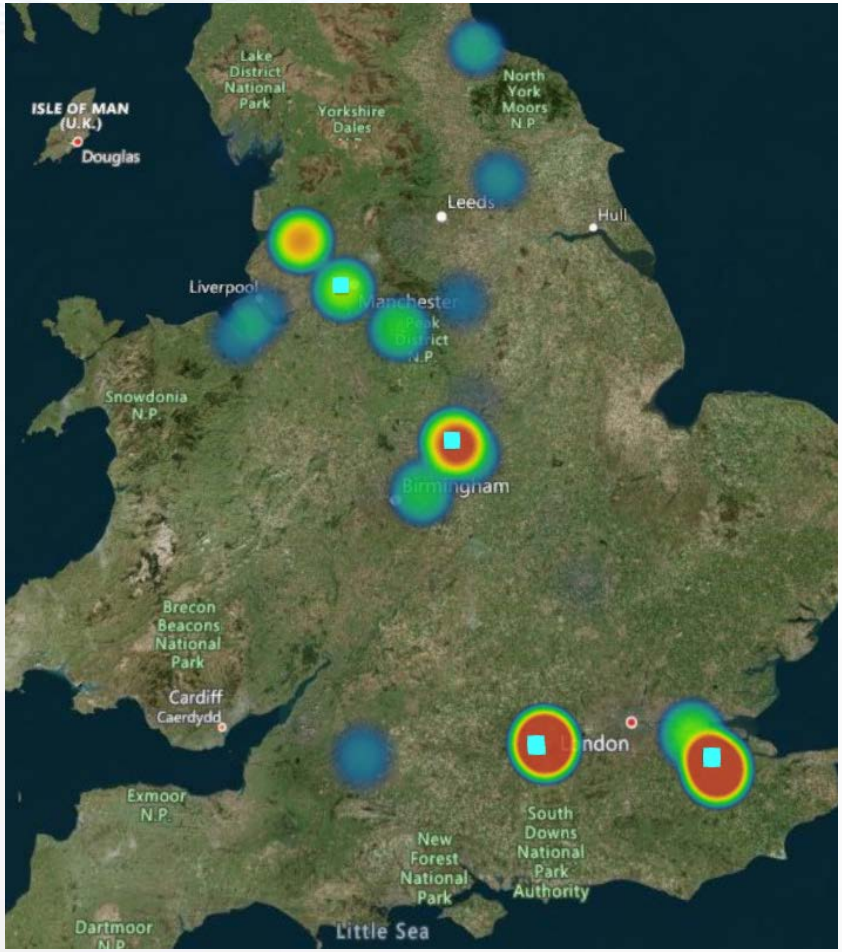


UCC area	No of delivery locations	No of depots serving UCC area
Birmingham	176	23
Edinburgh	14	10
London	528	21
Manchester	71	15
Norwich	5	4
Total	794	26

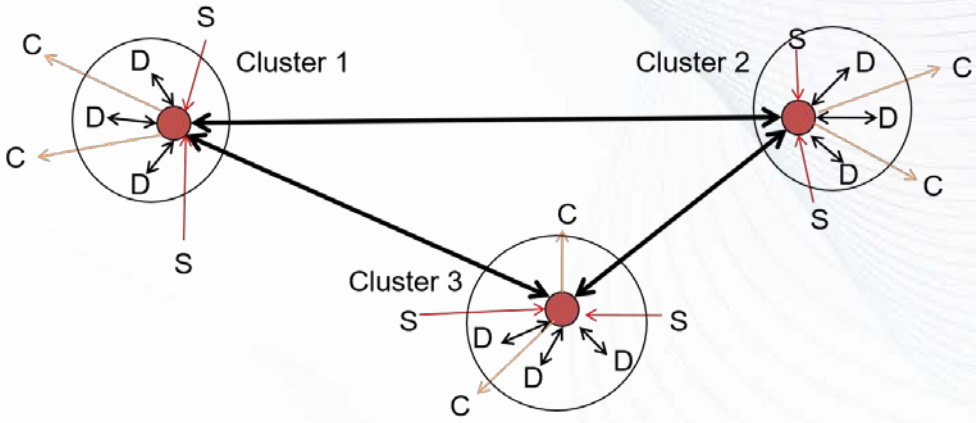
UCC location	No of delivery locations	Cost benefit	Km benefit	Cost saving %	Km saving %
Birmingham	73	£127,197	253,680	21%	46%
London	331	£3,980,074	5,337,419	48%	58%
Total	**404**	**£4,107,271**	**5,591,099**	**46%**	**58%**

Company	No of delivery locations	Cost benefit	Km benefit	Cost saving %	Km saving %
Company A	80	£2,571,097	3,346,168	55%	64%
Company B	15	£379,442	485,892	59%	67%
Company C	180	£637,895	1,018,744	28%	43%
Company D	129	£518,838	740,294	39%	53%
Total	**404**	**£4,107,271**	**5,591,099**	**46%**	**58%**

FMCG Logistics clusters (PI)



DC location pallet throughput heat map with 4 potential clusters



Cluster area	Cluster name	No of DCs in cluster
North West	Trafford Park	5
Midlands	Ashby De La Zouch	9
West of London	Wokingham	3
East of London	Halling	3

Only the 2 cluster strategy Ashby & Wokingham showed any benefit with a 4% cost reduction, 18% km & CO_2 reduction and 13% fewer vehicles

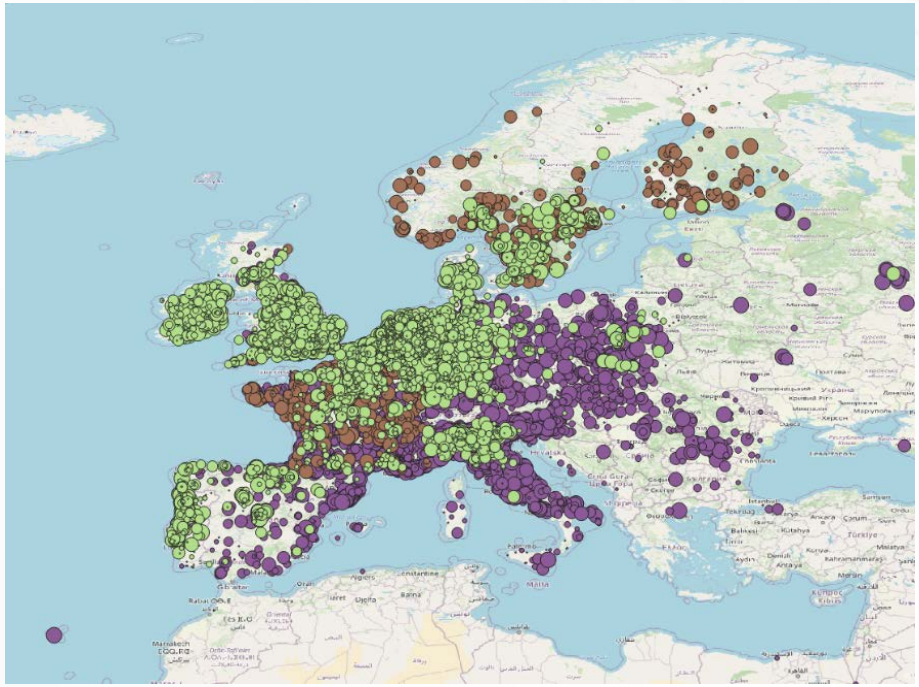
FMCG Intermodal

- Six rail terminals considered
- Relationship between road distance and rail distance
- Three road distance bands (up to 2mls, 15mls, 30mls)
- Minimum 300km of rail distance to be economically viable
- 26 pallets per wagon, 22 wagons per train

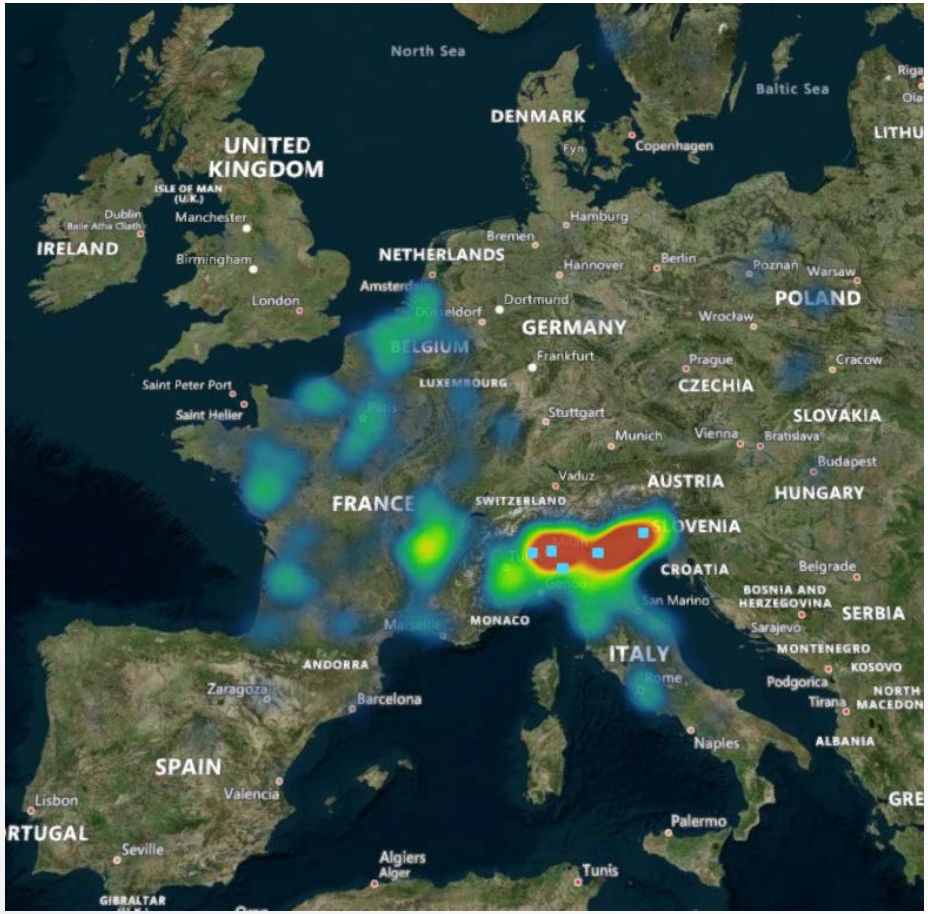
From	To	Trailers/day	Trains/day
East Midlands	Greater London	35	1.2
Greater London	East Midlands	46	1.5
East Midlands	North West	38	1.3
North West	East Midlands	98	3.3
North West	Greater London	38	1.3
North West	North East	39	1.3
North West	Scotland	37	1.2
North West	South East	51	1.7
North West	West Midlands	47	1.6
South East	South West	100	3.3
East Midlands	South East	38	1.3

LSP's and Terminal Operators

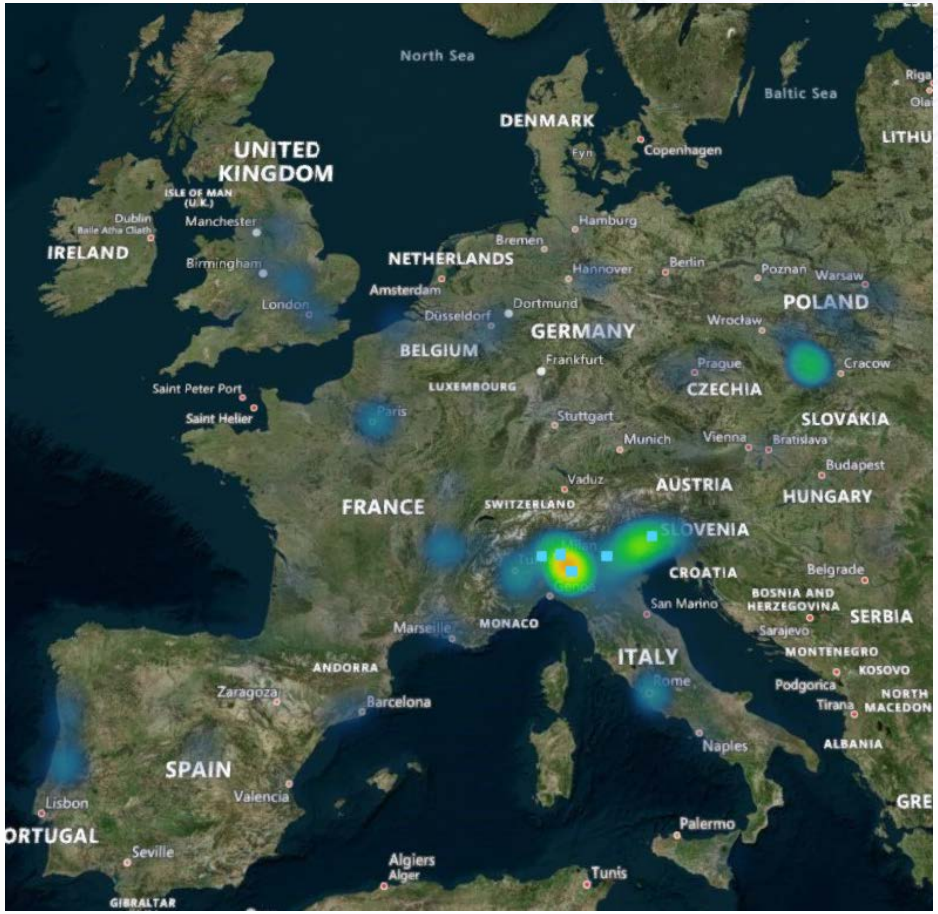
- Detailed base case analysis of historic data for each of the three LSP companies
  - Data cleaning and validation
  - Geocoding
  - Locational and density heat maps
  - Seasonality
  - Delivery sizes
  - Delivery times
  - Pareto



LSPs/Terminals trips heat map



Collections

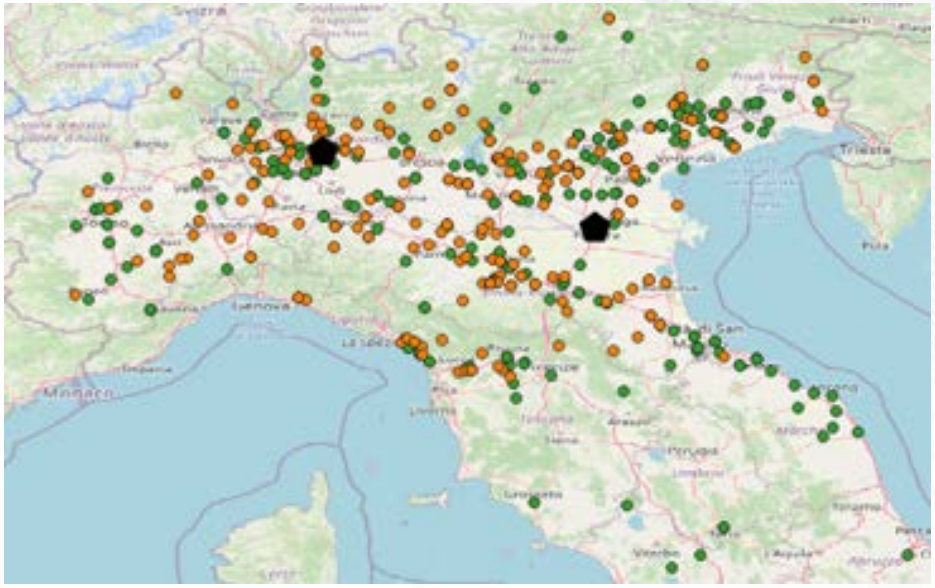


Deliveries

LSPs/Terminals outcomes

Country-lane	Company A	Company B	Company C	Total	Second largest
BE-BE	25	1940	5176	7141	1940
BE-FR	114	1929	1711	3754	1711
IT-GB	1558	0	1916	3474	1558
NL-SE	0	1290	1291	2581	1290
FR-FR	1916	272	1129	3317	1129
FR-GB	117	986	11132	12235	986
DE-DE	830	0	1913	2743	830
BE-SE	0	2599	733	3332	733
GB-IT	624	0	782	1406	624
IT-IT	8138	0	607	8745	607
NL-BE	0	897	539	1436	539
SE-BE	0	513	2024	2537	513
PT-FR	499	0	503	1002	499
ES-ES	499	0	883	1382	499
BE-GB	85	428	24637	25150	428
GB-FR	376	114	5994	6484	376
PL-PL	2096	0	376	2472	376
GB-GB	363	12	9908	10283	363
PL-GB	358	0	373	731	358
DE-GB	297	2	19181	19480	297
GB-BE	123	266	28885	29274	266
SE-NL	0	256	692	948	256
GB-DE	256	0	6202	6458	256
BE-NL	2	233	240	475	233
BE-IT	358	0	181	539	181

Top 25 country-lane overview of annual trips for the three companies



		Using Verona & Segrate RFTs in Italy	Using centres of gravity as RFTs in Italy
Intermodal	UK road distance	€ 717,338	€ 717,338
	Main rail leg distance	€ 3,748,247	€ 3,620,271
	IT road distance	€ 742,550	€ 803,514
	Total	**€ 5,208,135**	**€ 5,141,124**
Direct by road		**€ 10,693,853**	**€ 10,693,853**
Saving for rail over road		**-51%**	**-52%**

Chemical companies analysis

- Six Chemical companies totals

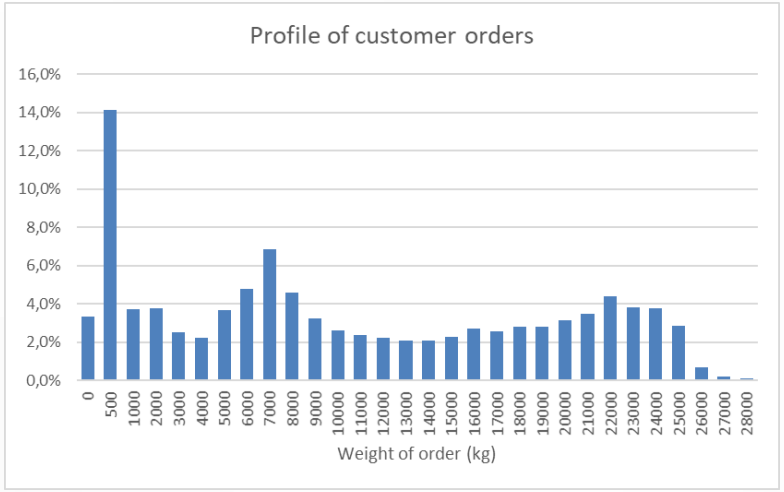
Number of Destination Locations	Number of Origin Locations	Number of Deliveries	Quantity Moved (kg)	Total Cost	Total Distance (km)
3.622	82	195.025	2.392.458.411	77.133.704 €	98.762.105

- Split per Chemical company

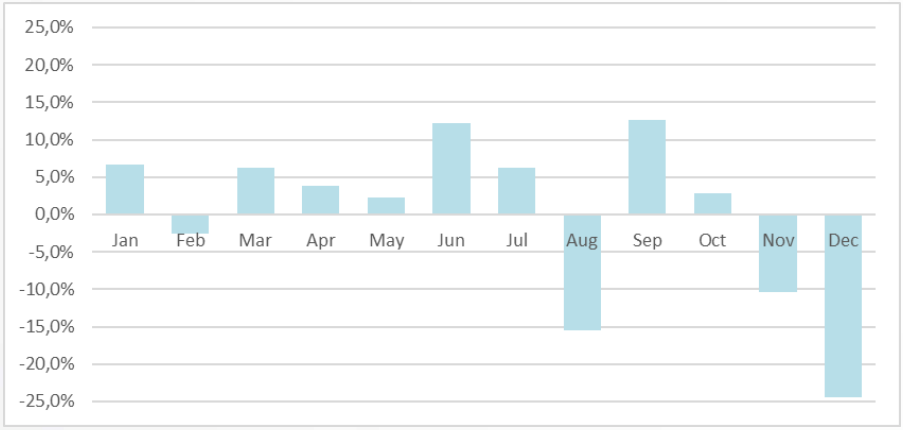
Shipper	Number of Destination Locations	Number of Origin Locations	Number of Deliveries	Quantity Moved (kg)	Total Costs
A	62	2	2.381	4.431.342,26	966.406 €
B	90	7	1.374	20.080.982,56	1.460.781 €
C	76	1	1.912	20.316.514,08	903.607 €
D	117	2	1.157	4.357.430,85	738.569 €
E	2.759	50	180.115	2.276.969.270,63	68.402.293 €
F	518	19	8.086	66.302.871	4.662.049 €

Chemicals Base case analysis

- Profile of customer orders: Very high proportion of LTL orders

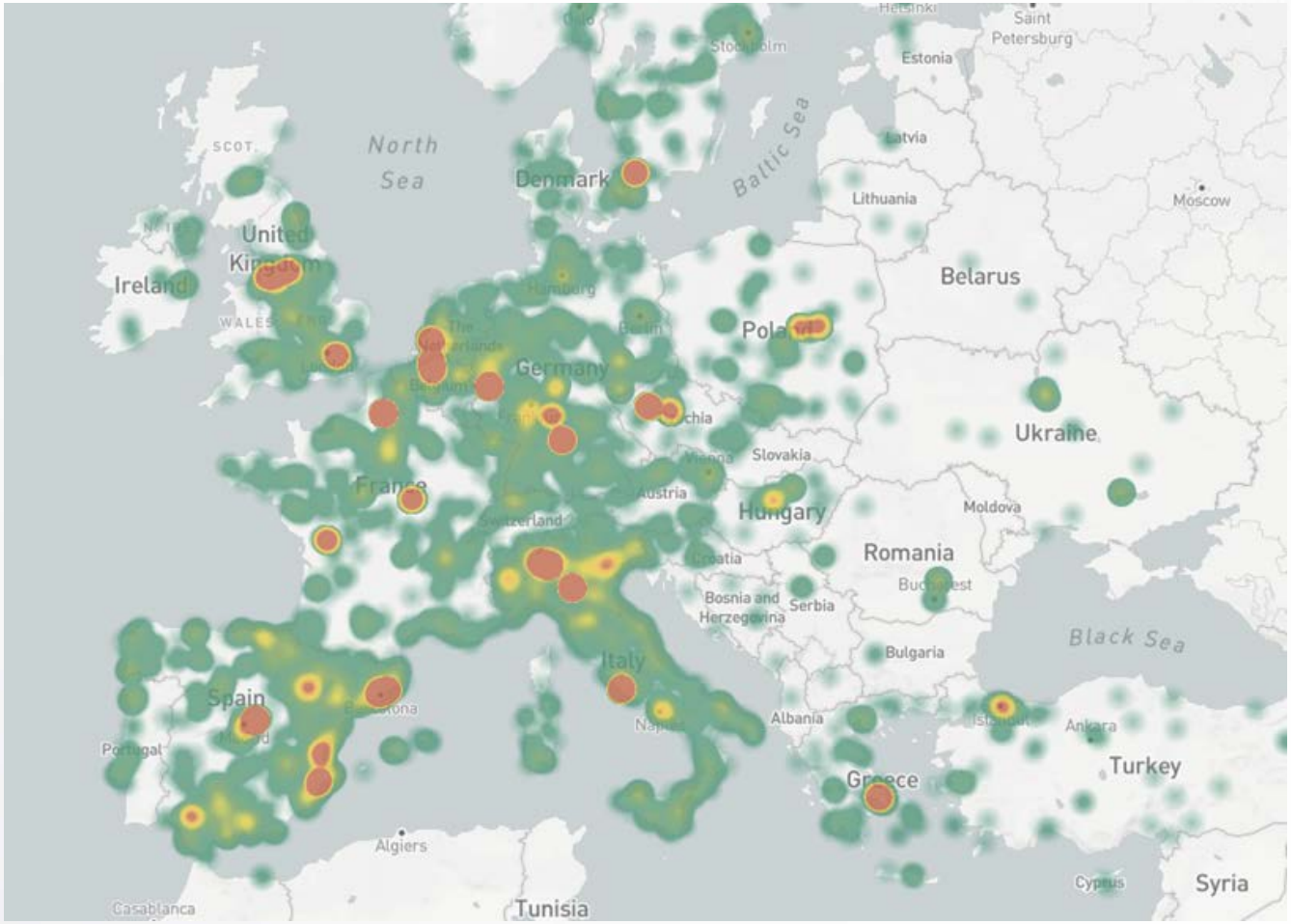


- Seasonality: fairly even across months, with high season in June/September, and low season in August, November/December



Chemicals Base case analysis

- Heat map of kilograms delivered by chemical companies in Europe



Results of the Analysis

- Backhaul, Co-Loading Results (7 opportunities)

Cost Overview - Gains for the community

	Individual	Combined
Total	10.908.089 €	10.032.595,43 €
		-8,03%

Route Utilization - Gains for the community

	Individual	Combined
Total	70,71%	79,86%
		9,15%

Total Kilometers - Gains for the community

	Individual	Combined
Total	7977178 km	7239420 km
		-9,25%

- Regional CC and Alternative Transport Modes Results

Scenario	Baseline	Open 10 DC	Open 10 DC MEGA
Total Cost	77.133.704 €	72.590.387 €	63.752.486 €
Savings in Percentages		-6%	-17%
Total Km Driven	98.762.105	93.235.828	77.967.867
Savings in Percentages		-6%	-21%

- Logistics Clusters and Multimodal collaboration Results

Scenario	Baseline	Open 20 CLUSTER	Open 20 CLUSTER Rail
Total Cost	77.133.704 €	63.678.615 €	54.772.282 €
Savings in Percentages		-17,4%	-29%
Total Km Driven	98.762.105	82.706.233	84.467.356
Savings in Percentages		-16%	-14%

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MDS Transmodal Role

- Not involved in the development of the technology behind LOGISTAR
- Providing a ‘business advice service’ to the consortium
  - Structure of the logistics market in Europe
    - Key commercial players
    - Logistics business models adopted
    - New and emerging models e.g. e-commerce
  - EU Transport policy
  - EU law covering both horizontal and vertical collaboration
    - Fair competition
    - Data sharing
- Outputs will inform future exploitation plan
- Produced four reports to date
  - Desk-top research and case studies

Key Conclusions To Date

- Majority of cargo is now moved by 3PLs and road hauliers etc.. on behalf of shippers
- Significant levels of collaboration already occurring
  - Within 3PLs – fleets utilised to convey cargo for multiple shippers
  - Between 3PLs/road hauliers – sub-contracting loads to ensure vehicle fill and minimise empty running
  - Variety of methods adopted to plan loads, seek sub-contractors etc..
- Opportunity for LOGISTAR to ‘digitalise’ this process
  - Flows into and between large scale distribution centres
- Market test these desk-top conclusions with key industry operators

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Progress of the LOGISTAR System

User Board Webinar – December 9th, 2020

Christian Gengenbach

Reinhard Rust

Gaetano Formisano

software AG
Freedom as a Service

dbh
dbh Logistics IT AG

GENEGIS GI
Geographical Intelligence

Agenda

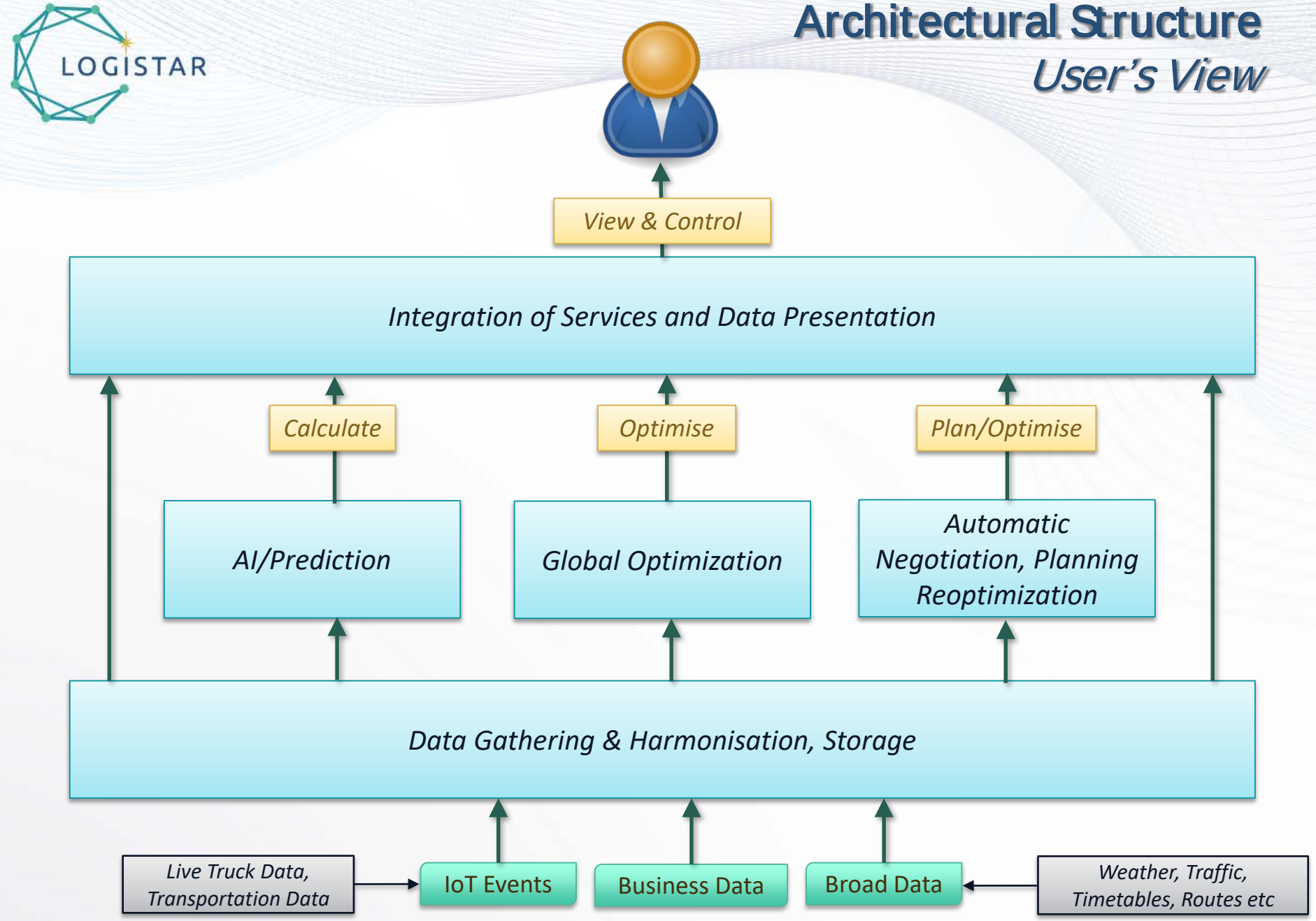
- **The LOGISTAR system**
- **The “Planner Module”**
- **The “Real-Time-Monitoring Module”**

System Access – Cloud Based

- LOGISTAR offers services to planners and dispatcher of Logistics companies
- Cloud-Based – Access to web-app from any device on the internet

Architectural Structure

User's View



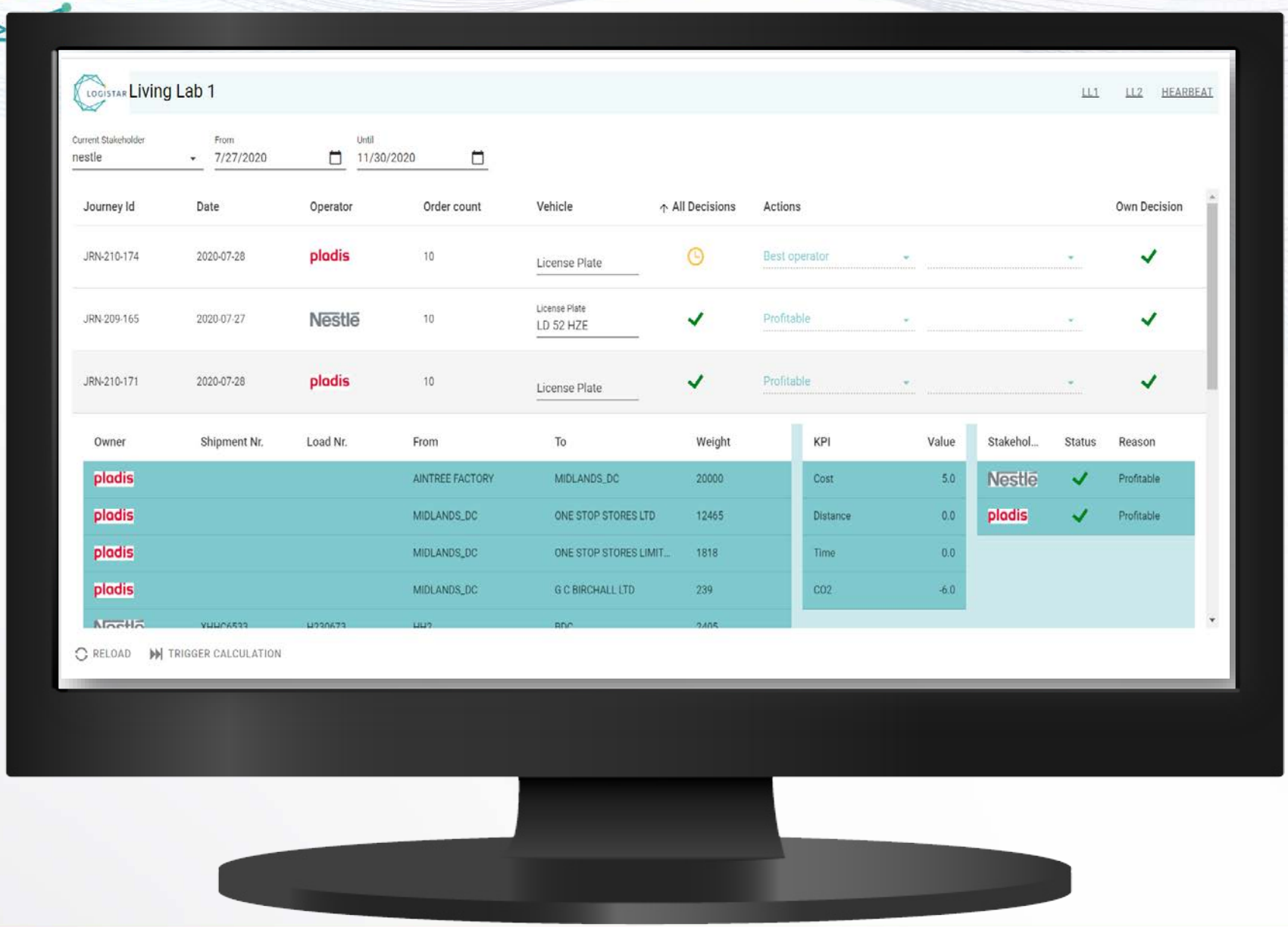
Web-based Usage

- LOGISTAR is just another **link in the browser**
- Starts with a Logon-Screen (authentication)
- **Role based** access (authorization)
- **Planner** screen and a **Real-Time-Monitoring** screen
- The **Planner** screen supports the users in finding the optimal usage for their logistics resources
- The **Real-Time-Monitoring** component supports the dispatchers in monitoring the journeys, adapting the scheduling and adapting the plan when disruptive incidents happen

What is the “Planner Module”?

- Logistic Planners search for „**horizontal collaboration**“ (e.g. jouneys with orders of different companies/participants)
- **Planning process** ~2 days before the journey
- Orders must be sent to LOGISTAR **in advance**
- LOGISTAR calculates and proposes „**collaborative journeys**“
- Planners (of participating companies) **decide** independently upon their acceptance
- Overall decision is **immediately visible**

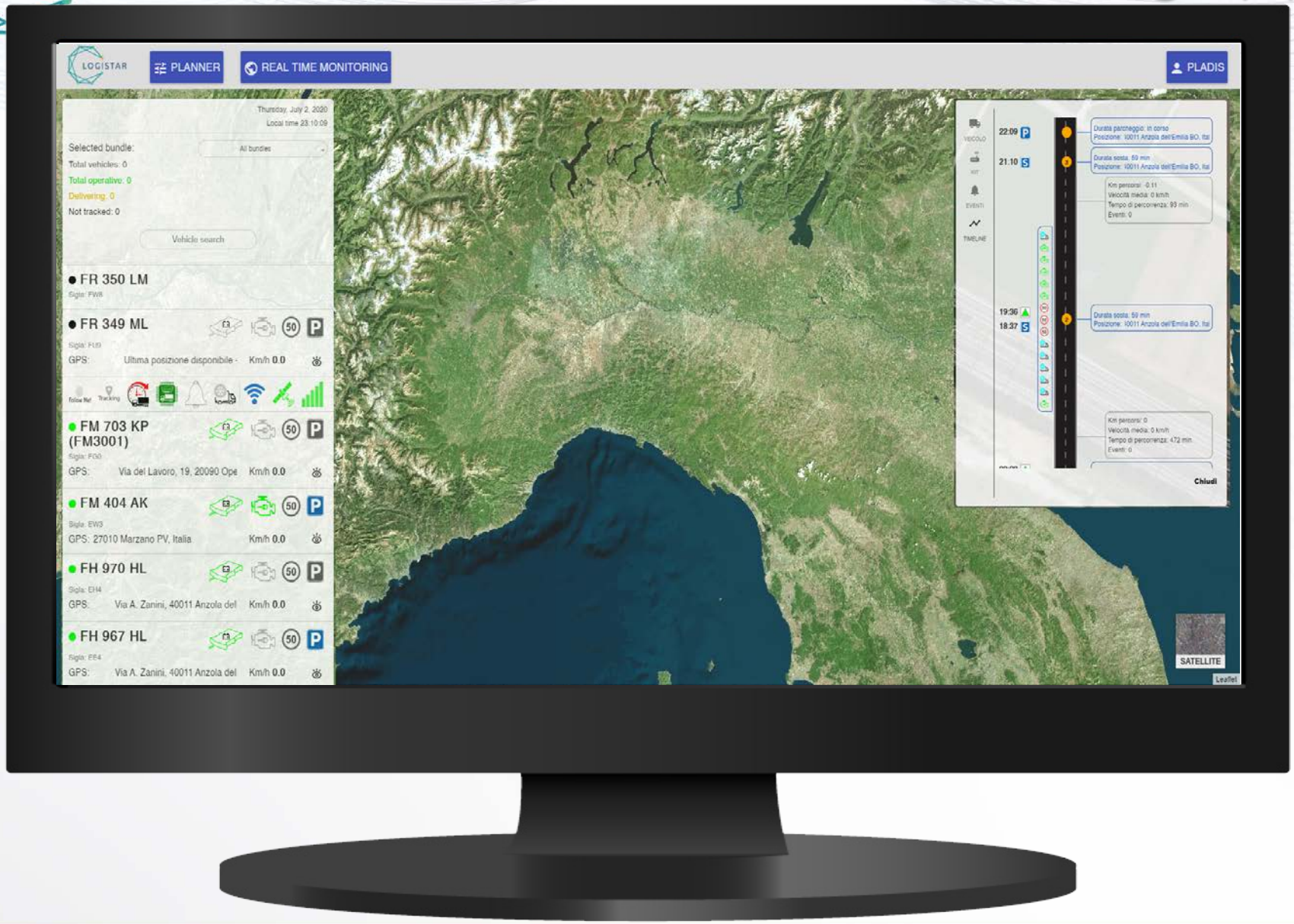
“Planner Module”



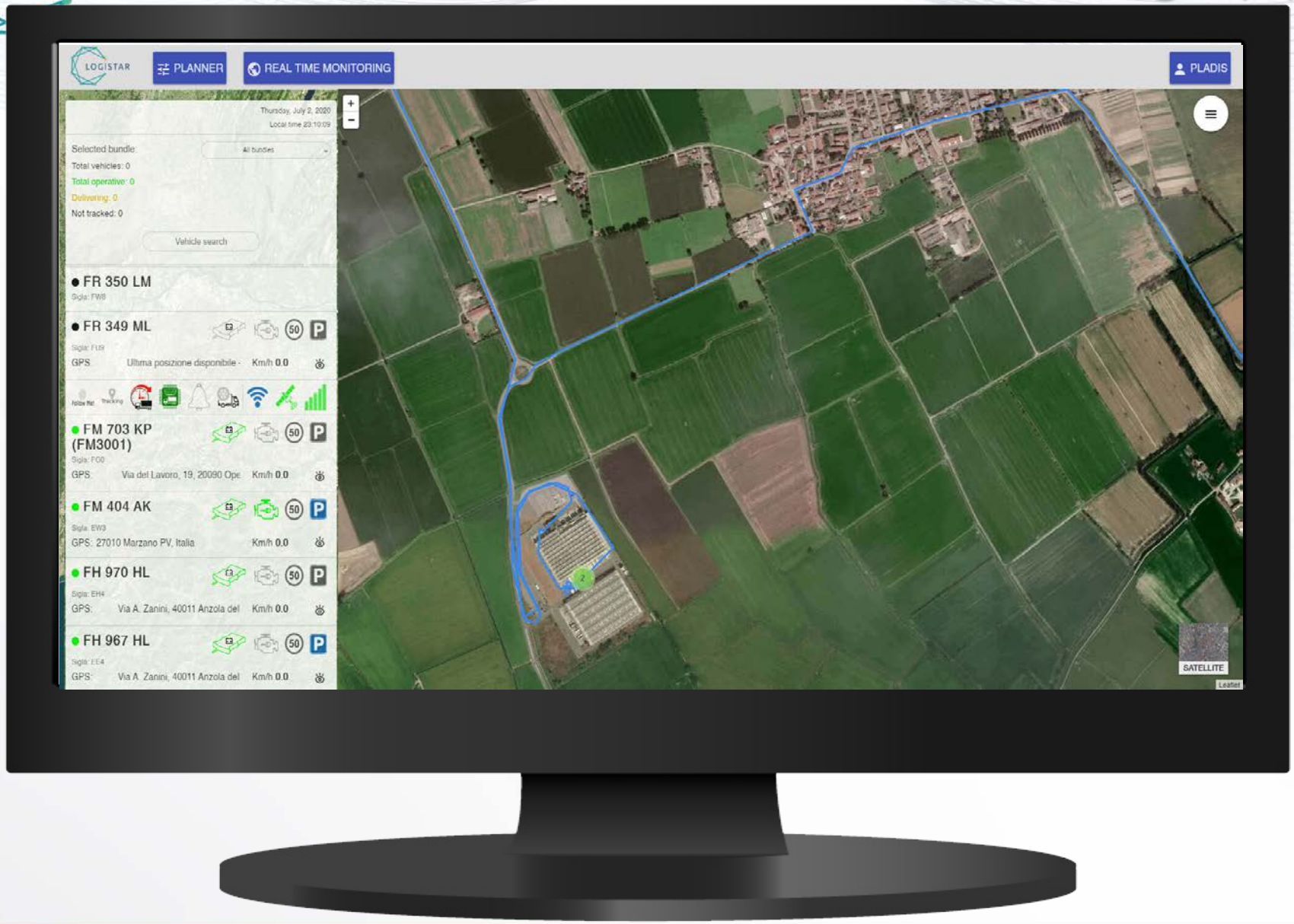
What is the “Real-Time-Monitoring”?

- Survey „**collaborative journeys**“ operated by other partners
- **Real-Time-Monitoring** starts with the operative journey
- Shows **extended information** besides current positions: orders, arrival times, loads, …

“Real-Time-Monitoring” (1)

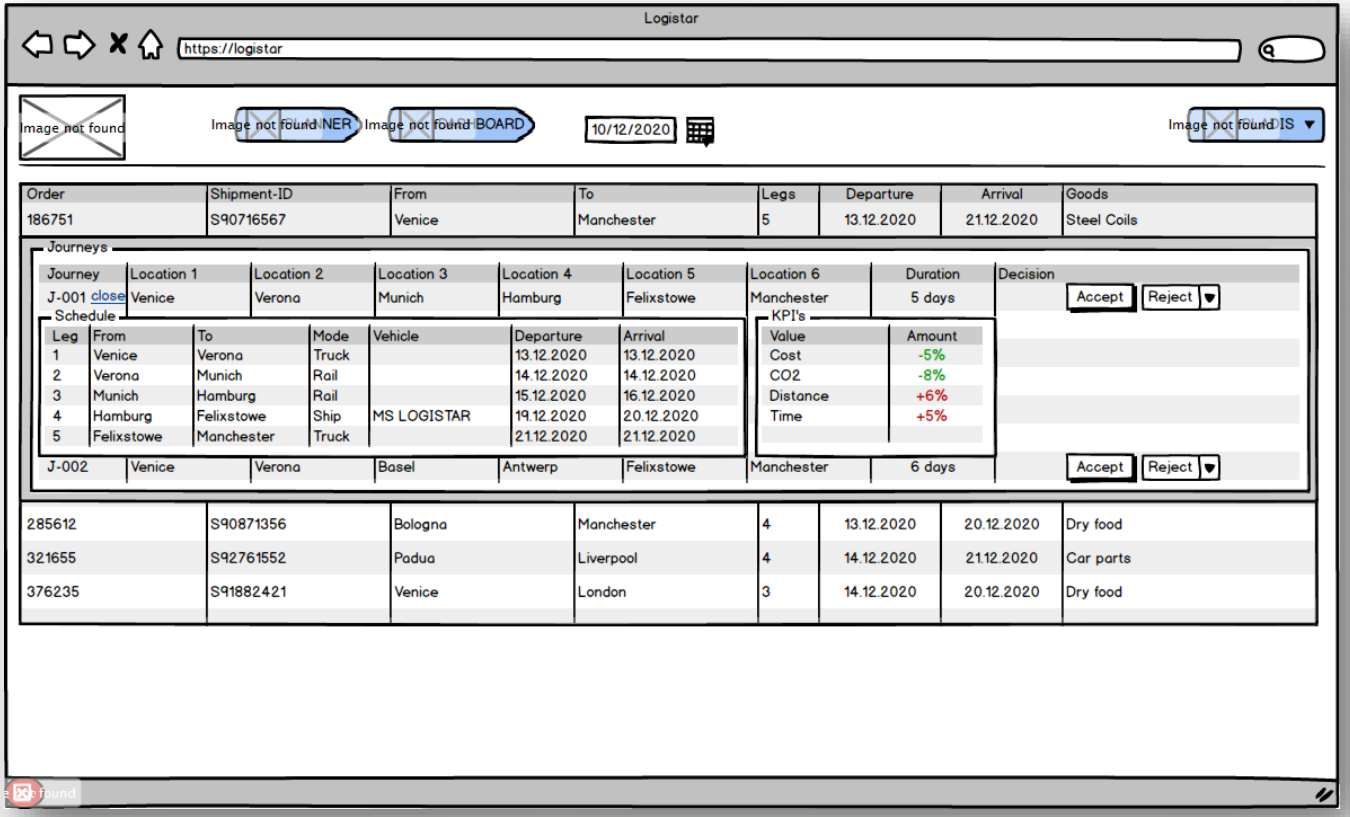


“Real-Time-Monitoring” (2)



Outlook: Planner Service for LL2

- Similar user interface as in Living Lab 1
- Focus on multimodal transports with multiple legs
- Under construction…



Contact information

www.logistar-project.eu

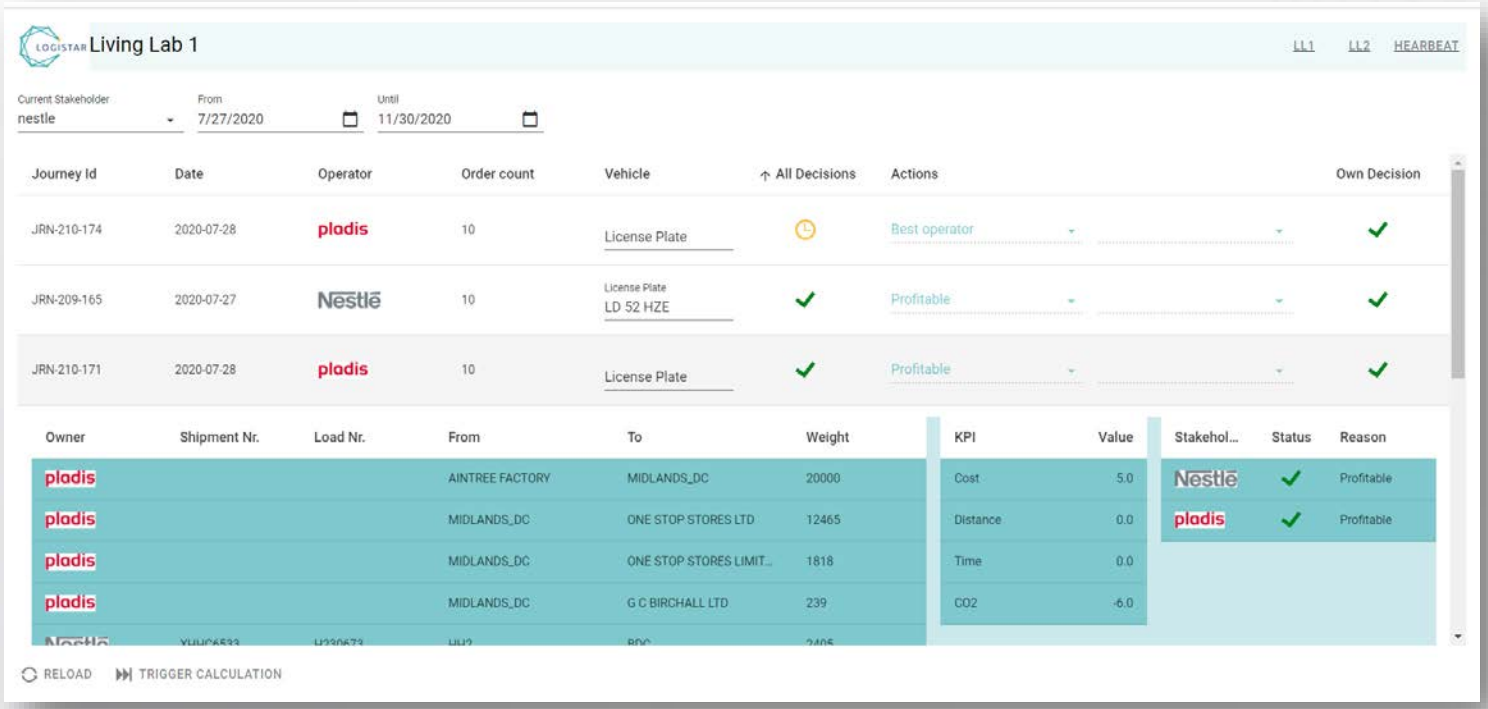
Contact information of the speaker

@LOGISTAR_H2020 Logistar Project group

LOGISTAR project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 769142.

Planner Service for LL1

- As for Living Lab 1 (Use Case 1) the Planner presents possible collaborative routes, which in total safe money for one or more of the participating logistic companies.



Nestlé

pladis

Sally Wright – Nestlé

Paul Stothard – pladis

The Story

pladis

The Daily Telegraph BUSINESS

Food and drink firms share trucks

60 SECOND BRIEFING

RBS warns clients of market turmoil

Longbridge prepares to relaunch MG Rover

TRANSPORT COLLABORATION

SHARING THE LOAD

As the need to cut costs – and food miles – rises up the agenda, retailers and manufacturers have started to take collaborative distribution to the next level. Nick Hughes reports

WORKING TOGETHER

www.roadtransport

MotorTransport

ve 800 trucks from UK roads

eal could miles

Nestlé Logistics

We deliver for Nestlé

We need to collaborate more

- 29.6% of domestic road freight miles are empty (DfT Survey 2019)
- The 2008 Climate Change Act sets a legally binding target to reduce the UK's greenhouse gas emissions by at least 80% by 2050. Heavy goods vehicles are currently estimated to account for around 17% of UK GHG emissions from road transport and around 21% of road transport NOx emissions, while making up just 5% of vehicle miles (DfT Freight Carbon Review 2017)
- Transport Collaboration is a key action in both the DfT Freight Carbon Review and the FDF Ambition 25
- We're wasting a scarce resource and lot of money

Speed Dating?

Speed Daters

pladis

Heinz good food every day

P&G

Unilever

IGD

Grampian Country Food Group – Traditional Goodness

Dairy Crest

PepsiCo International

Nestlé – Good Food, Good Life

Allied Bakeries

Sainsbury's

Nisa Today's

Wincanton

Cadbury

ASDA

Booker

Premier Foods

Coca-Cola Enterprises

Kimberly-Clark

Mars

The co-operative

Kraft

Musgrave Group

UB

Tesco

DHL

Boots

Waitrose

Somerfield

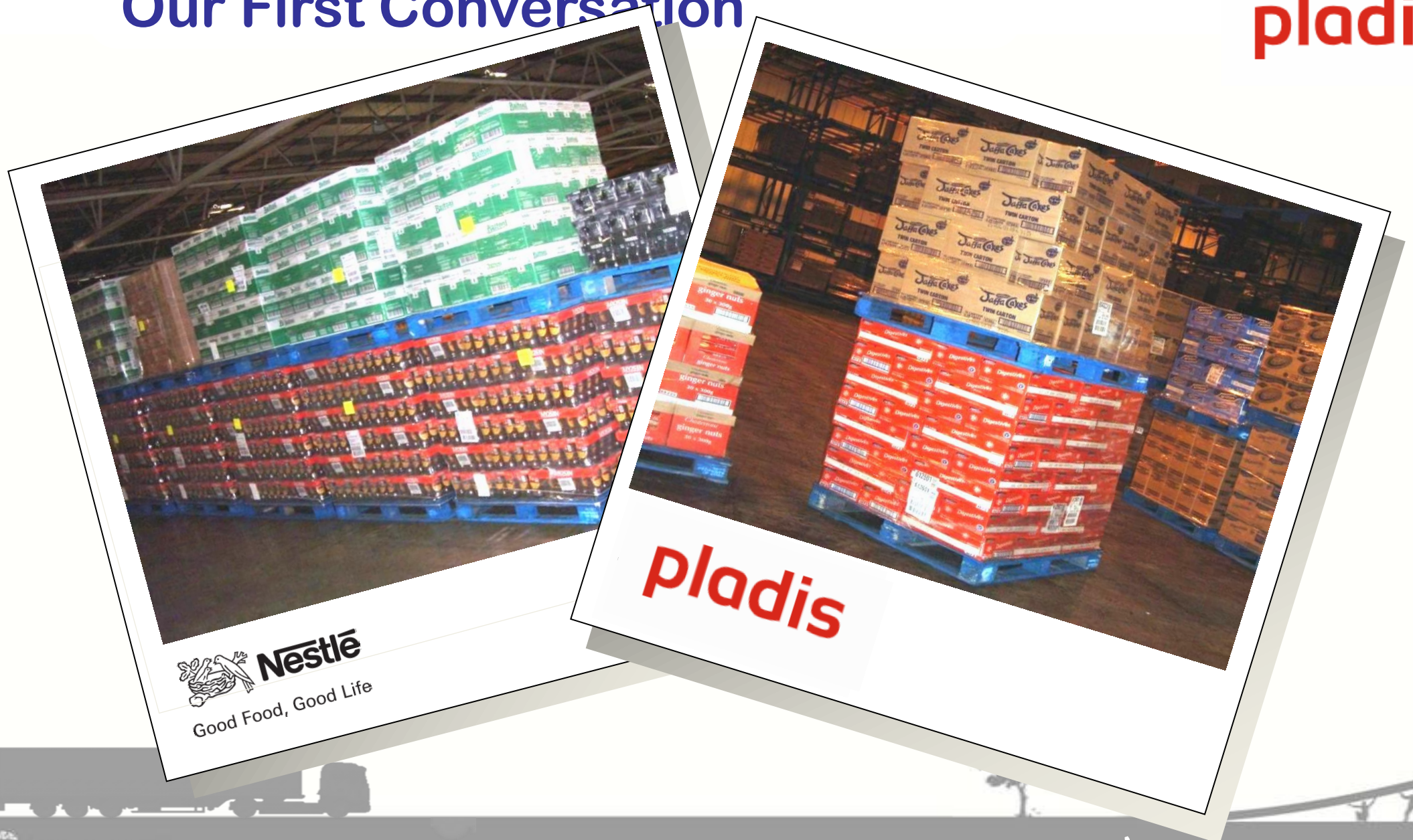
Cott

How did we meet?

Our First Conversation

Our First Conversation

pladis

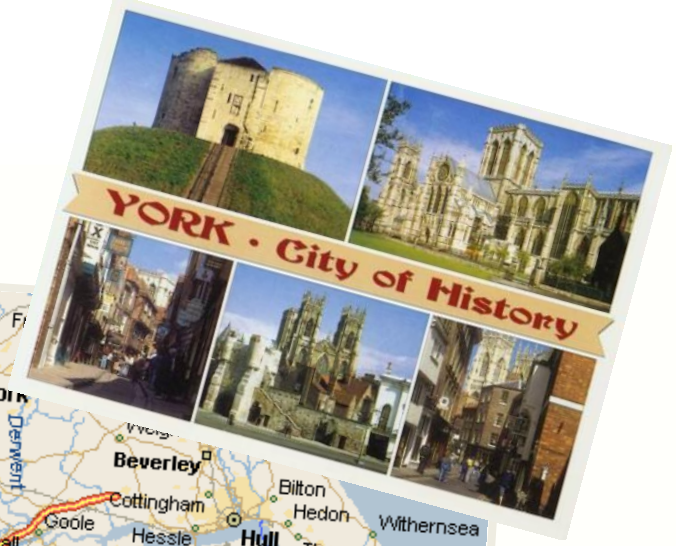


Our First Conversation

pladis

Our First Conversation

pladis



Our First Conversation

pladis

pladis

Nestlé

Good Food, Good Life

Barriers To Collaboration

- Physical
  - vehicles, products, loading/unloading etc 
- Trailer Liveries
- Protection Of New Product Launches
- Financial parity
- Safeguarding Competitive Advantage

Prerequisites For Success

- Shared environmental vision
- Support for collaboration from the very top of both businesses

  "We compete on the shop shelf, not in the back of a lorry"
- Pragmatism, flexibility, trust & honesty
- An independent 3rd party to stimulate, moderate and encourage collaboration

Barriers To Collaboration

- Physical ✓
  - vehicles, products, loading/unloading etc
- Trailer Liveries ✓
  - ruled out as an issue
- Protection Of New Product Launches ✓
  - trucks loaded and sealed out of sight of driver
  - satellite tracking
- Financial parity ✓
  - know your costs & be prepared to negotiate
- Safeguarding Competitive Advantage ✓
  - set clear boundaries to your partnership

Nestlé & pladis

- Collaboration engrained into the operations

From	To	Annual Kms Saved
York	Bardon	96,500
Scunthorpe	Bardon	4,500
Halifax	Bardon	22,500
CPUK	Customer	157,250
Total		280,750

Logistar – the future of collaboration

- Logistar enables this to develop further by providing
  - System driven collaboration opportunities
    - Factory to DC
    - DC to Customer
    - Multi-collection across both Businesses to customer…?

- Logistar will not replace our transport planning systems, it is an additional tool to calculate opportunities which are considered by Nestle and pladis and “accepted” or “declined” by either Business

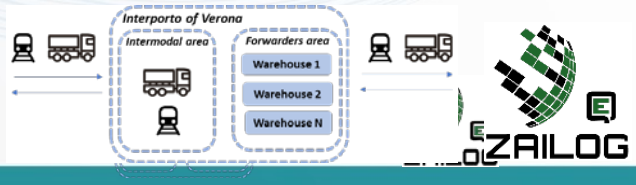
- Future partners will enhance this, growing the opportunity to collaborate as the volumes and available routes increase

Thank you

Living Lab 2 - Synchromodality

Codognotto – ZAILOG

Guido Piccoli – guido.piccoli@external.codogotto.com



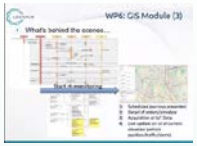
Our logistic flow

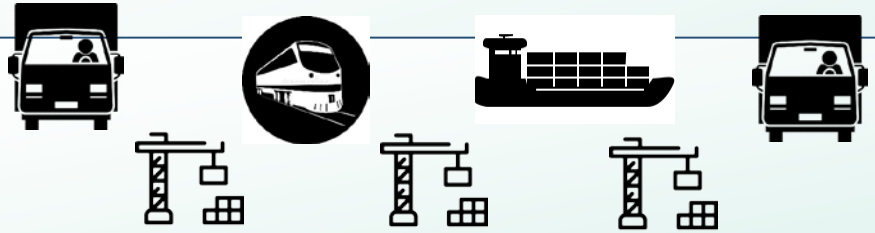
Dynamic assignation

ROUTNG Optimization

SCHEDULING Vs REAL TIME LOCATION by IoT

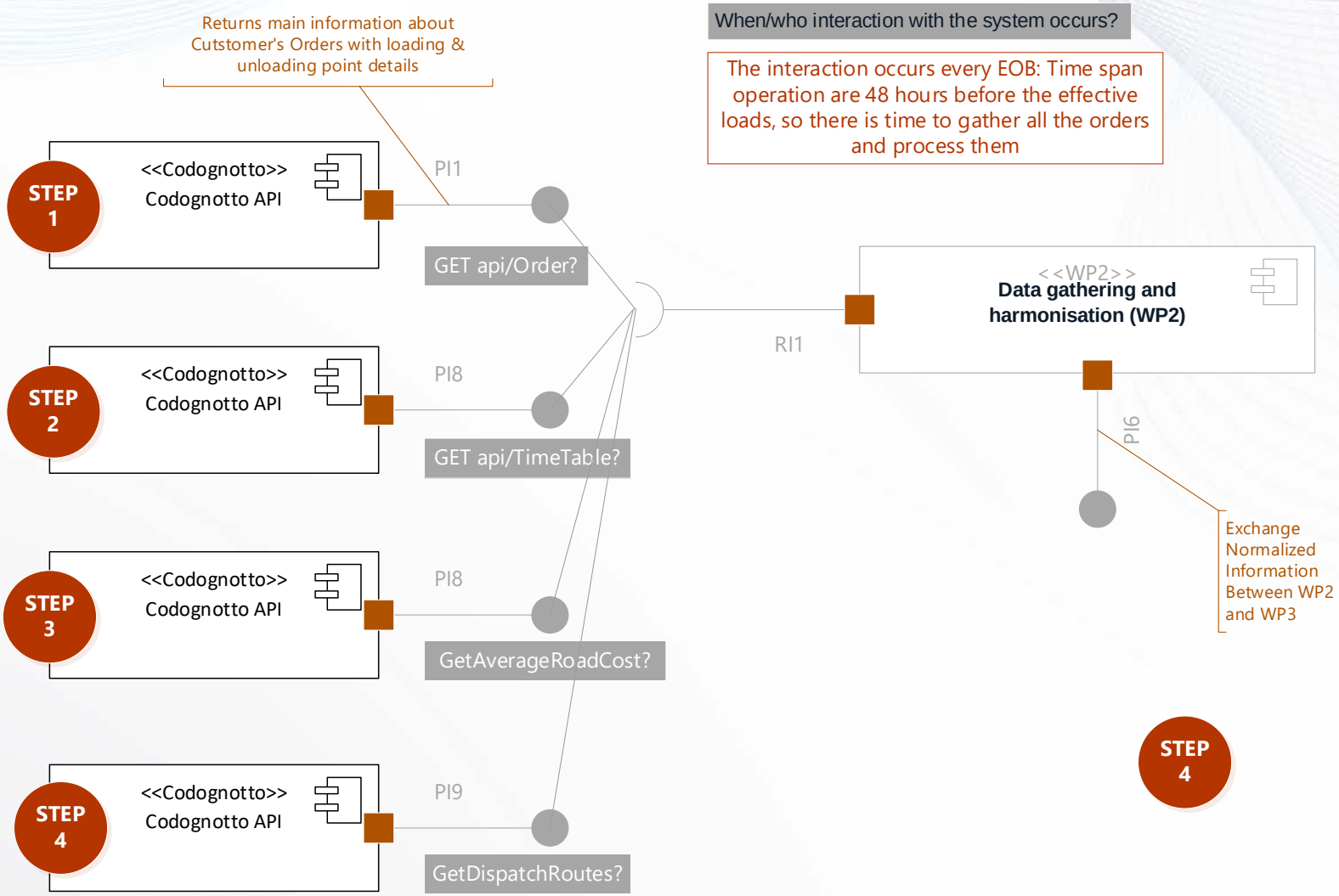
MONITORING & ALERT Ev. RE-SCHEDULING





DATA Statistics, dispatching evaluation (potential optimization) and BI

API Interfaces Versus WP



LOGISTAR

Living Lab 2 - Syncromodality

Thank you

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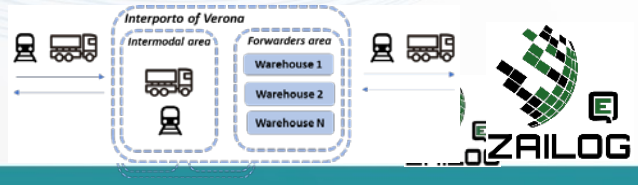


Brambles

CHEP

A Brambles Company

... in a nature positive way.

Circular Economy Pioneers

CHEP
A Brambles Company

As a pioneer of the circular economy, **Brambles** platforms form the invisible backbone of **global supply chains**.

Our **Share & Reuse** business model is **intrinsically sustainable**.

We serve our **customers** minimizing negative environmental impact.

FY20 Sustainability Highlights

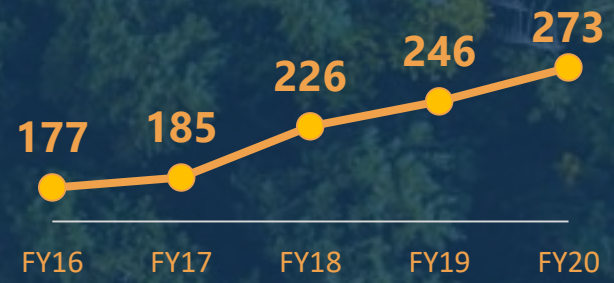
CHEP
A Brambles Company

Together, we've built better supply chains.

In 2020:

We achieved **33% reduction of our CO_2 emissions** vs 2015.

We achieved our **Zero Deforestation** target through 100% wood sourcing from FSC/PEFC certified forests.



We coordinated collaboration projects with **more than 270 customers to save 75M km** empty transport distance.

For more details, see Brambles' FY20 Sustainabilty Review

From Better to Positive

CHEP
A Brambles Company

But being “less bad” is no longer enough.

Through our 2025 targets we aim to create **Regenerative Supply Chains** that do more good than harm, and become ‘**Positive**’.

From Better

To Positive

SUSTAINABLE DEVELOPMENT GOALS

Thought Leadership Community Partners

Thought leadership:

SB SUSTAINABLE BRANDS

ELLEN MACARTHUR FOUNDATION

Community partners:

The Global FoodBanking Network®

EUROPEAN FOOD BANKS FEDERATION FEBA

CHEP
A Brambles Company

Barron's* Rated #1 most sustainable international company

MEMBER OF Dow Jones Sustainability Indices In Collaboration with RobecoSAM — 96th percentile in industry category

CIRCULYTICS™ / ELLEN MACARTHUR FOUNDATION — Rated A in Circular Economy Assessment by Ellen MacArthur Foundation

MSCI — Maximum AAA rating

FTSE4Good — Constituent of the FTSE4Good index 2014-2020

* Published by Dow Jones, sister publication to The Wall Street Journal.

Circularity enablers

CHEP
A Brambles Company

To pioneer regenerative supply chains, **collaboration is key**.

We enable our customers to become more circular and sustainable

- **Creating lean, efficient and resilient supply chains**
- **Providing sustainable services, in a sustainable way**
- **Minimizing waste, packaging and resource consumption**
- **Fostering collaboration projects across the entire supply chain**

CHEP
A Brambles Company

Creating Regenerative Supply Chains, together.

Brambles

CHEP
A Brambles Company

Zero Waste World

Brambles

CHEP

A Brambles Company

... in a nature positive way.

Our 2025 Sustainability Targets

CHEP
A Brambles Company

Planet Positive

Forest Positive
Grow two trees for every tree we use

Climate Positive
Commit to a 1.5°C climate future

Waste Positive
Create reusable solutions out of existing waste

Business Positive

Supply Chain Positive
Make our business even more circular

Collaboration Positive
Double the number and impact of customer collaborations

Workplace Positive
Become a top company in inclusion & diversity

Communities Positive

Food Security
Serve food to 10 million people

Circular Transformation
Activate 1 million Circular Economy change makers

Social & Natural Positive
Increase social and natural capital

What means LOGISTAR for us ?

CHEP
A Brambles Company

Digital Transformation is key

to reduce inefficiencies and make EU Supply Chains sustainable for the future

Fostering Horizontal Collaboration

among SC partners is vital and part of Logistar and Brambles DNA

Circular Economy

Sharing and Reusing Models Enable New Opportunities

User Group Meeting

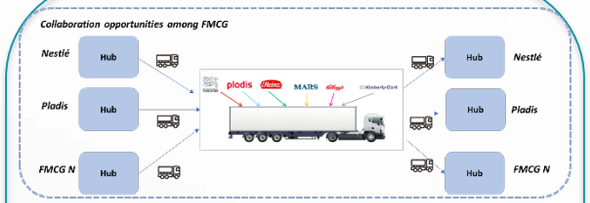
Living Lab 3
(Virtual Living Lab)

Ahlers Antwerp

9th of December 2020

The initial Living Labs

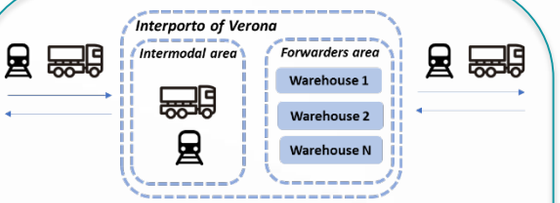
LOGISTAR services will be **tested under real operation environment** in three Living Labs



Backhauling and Co-loading

Process of various information coming from the different companies (*schedules, resources, constraints, truck, positions, empty return legs…)* to improve backhauling management

Overall overview of the status of the operations through the real-time dashboards and the real-time information on road transport system.



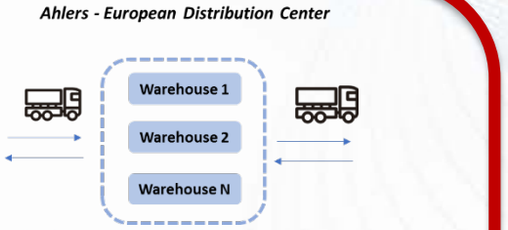
Synchromodality

Real time re-planning due to disrupting events: corrective and preventive

Planning of synchromodal routes basing on real time events.

Dynamic assignation of freight transport networks.

Real time status on goods movements: position of vehicles, arrival time of cargo fleets.



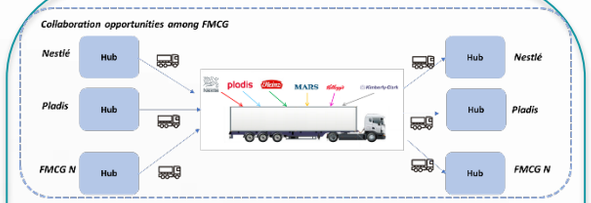
Real time logistics in Chemical Industries

Real time planning of resources looking for transport synergy and bundling opportunities.

Real-time alerts and recommendations to take action, facilitating the decision-making process.

The New Living Labs

LOGISTAR services will be **tested under real operation environment** in three Living Labs



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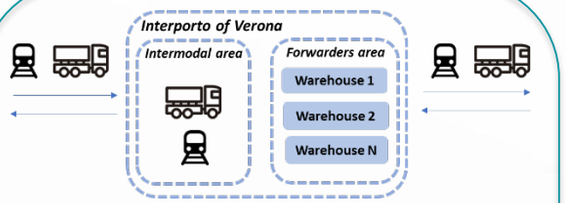

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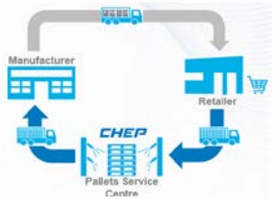
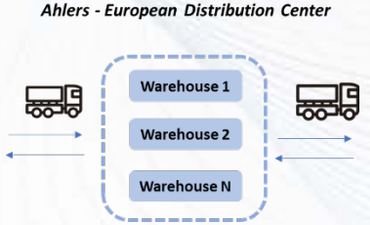


Reduction of waiting times

The reduction of waiting times through live vehicle tracking and a reliable prediction of the ETA combined with a sophisticated software solution to manage and allocate slots dynamically is key for a smooth and efficient transport operation; as per our experience this would also be a key enabler for efficient Horizontal Transport Collaboration projects.



Virtual Living Lab

Real time planning of resources looking for transport synergy and bundling opportunities.

Real-time alerts and recommendations to take action, facilitating the decision-making process.

Going from theory to practice

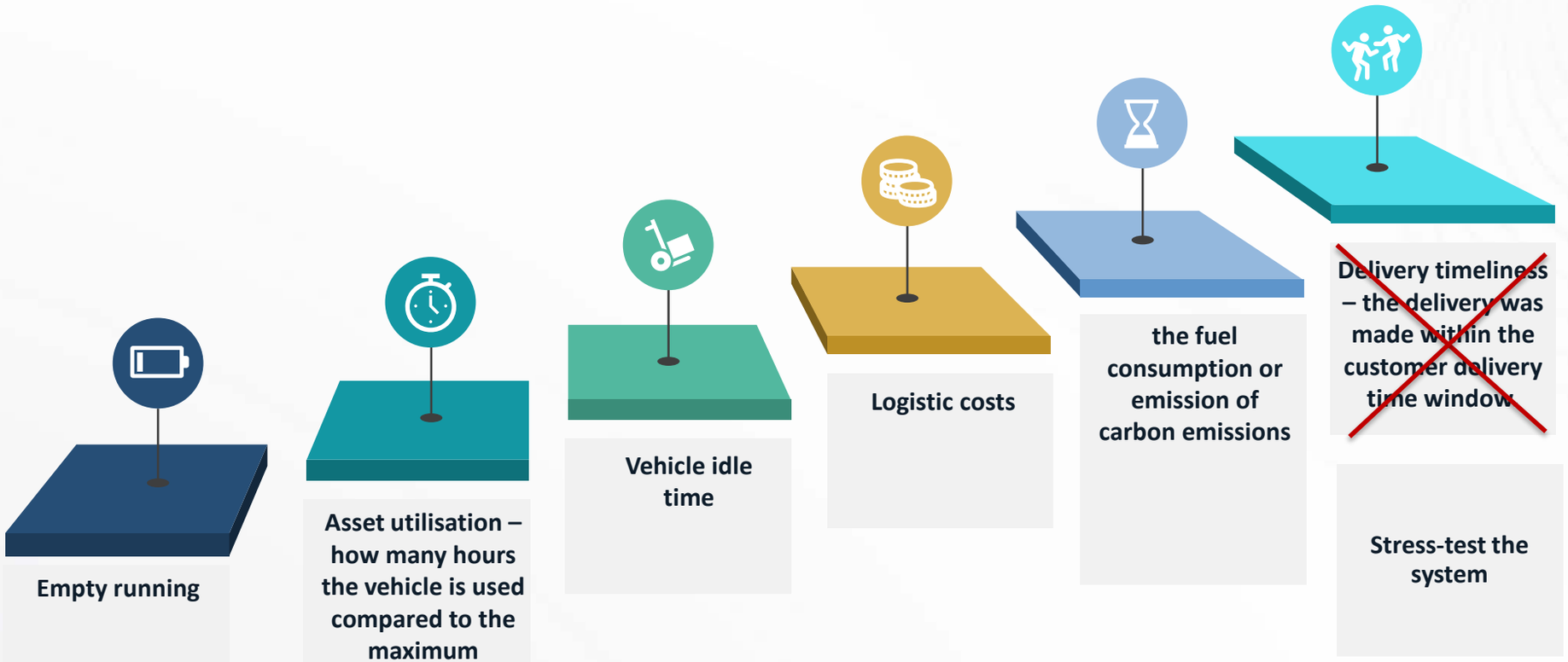
- The study previously shown was conducted based on historical data. Similar to what is happening in Work Package 1.

- The next step towards implementation is to test a system that can bundle loads in real time (when orders come in)

- With this scale and type of shipments this use case was an ideal fit for our virtual living lab:
  - Big network: can Logistar cope with this scale?
  - Bundling potential: can Logistar achieve savings that are in line with the strategic study?
  - Future interest: Can our customer become a potential user of the Logistar system in the future?

Virtual Living Lab: Outcome

Outcome



LOGISTAR

Questions?