Cognitive Logistics Operations through Secure, Dynamic and ad-hoc Collaborative Networks
The COG-LO project

Kostas Kalaboukas, SingularLogic SA

IPIC conference, London 11 Jul 2019

Trends

COGLO

eCommerce growth

Same day delivery

Universal Postal Sector Transformation

Globalization

...

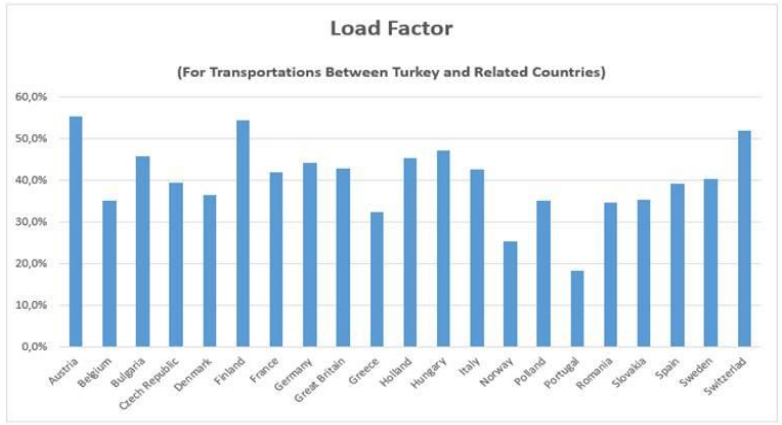
SingularLogic

Main Challenges

COG-LO

Load factor optimization

Today



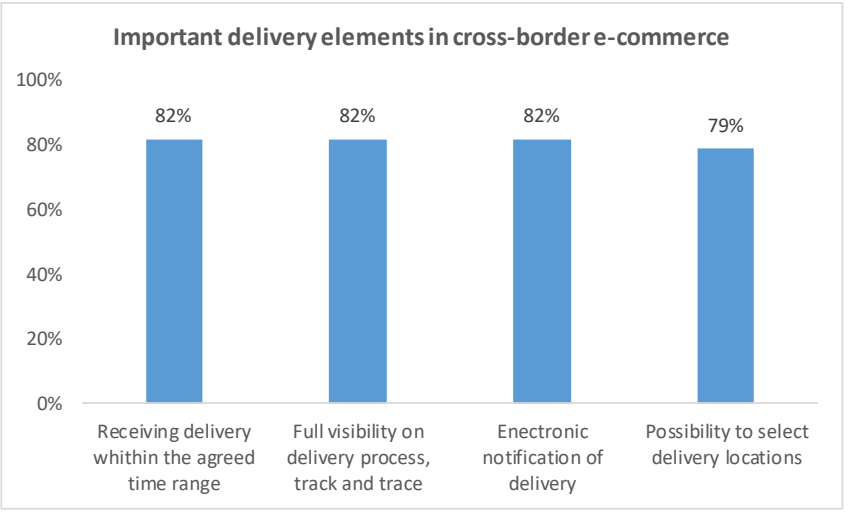
EKOL figures

Dynamic response to events and ad-hoc orders

- Ad-hoc deliveries/ returns
- Missed deliveries

~25% of the total delivery requests for EKOL Logistics is on the fly.

The growth of ecommerce and Cross-country deliveries



Ecommerce Europe's Cross-Border E-commerce Barometer 2016

The need

- Merge/consolidate deliveries
- Identify "nearby" opportunities
- Create ad-hoc collaborations

- Flexibility
- (re)schedule deliveries
- Knowledge generation from big data (events, missed deliveries, traffic, etc.)

- Common information models
- Alignment of tools and delivery processes

COG-LO

"Cargo Hitchhiking" Tool

- IoT and Analytics technology
- Tools to identify possible collaborations in real-time and along the route

"Cognitive Logistics Advisor" tool

- AI/ Predictive analytics
- Cognitive Logistics Object (CLO)

Secure, private and trusted networks

- Security and Privacy aware policies
- Blockchain ensuring trust

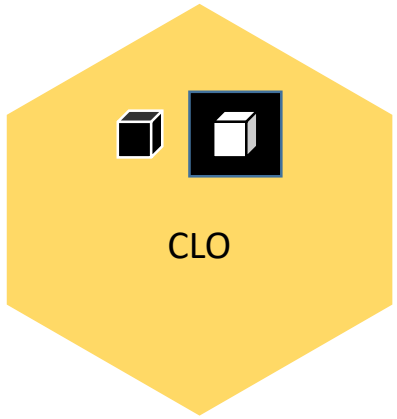
Collaborative and Cognitive Logistics Framework

CLO is a **virtualized entity** that participates in the logistics process,

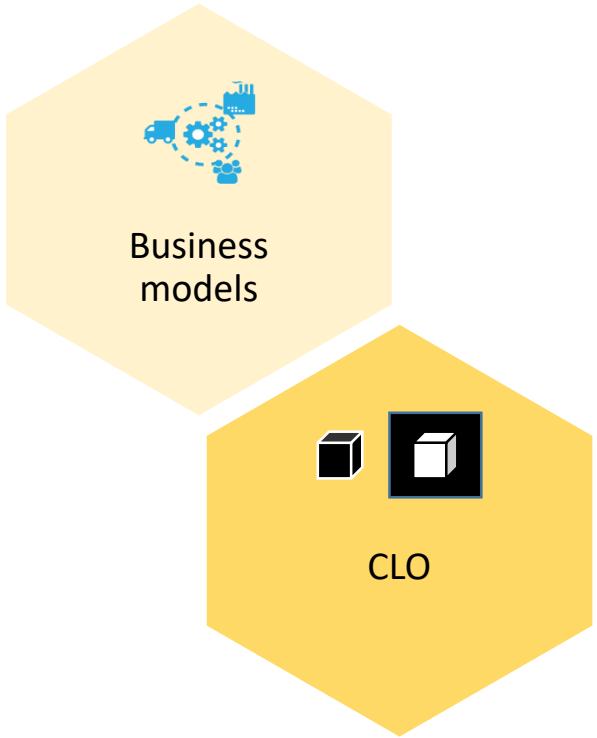
(digitally) represents **different actors** such as cargo, truck, traffic infrastructure, supporting system, etc. (depending on the case)

and has a **different capabilities** (from basic functionalities up to autonomous decision making and actuation),

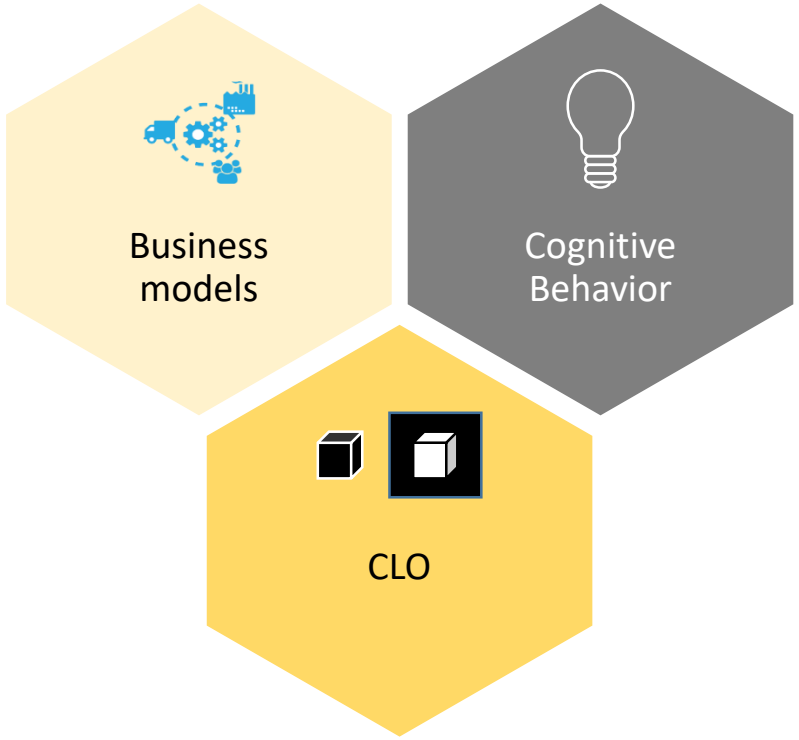
which are **configured** per case.



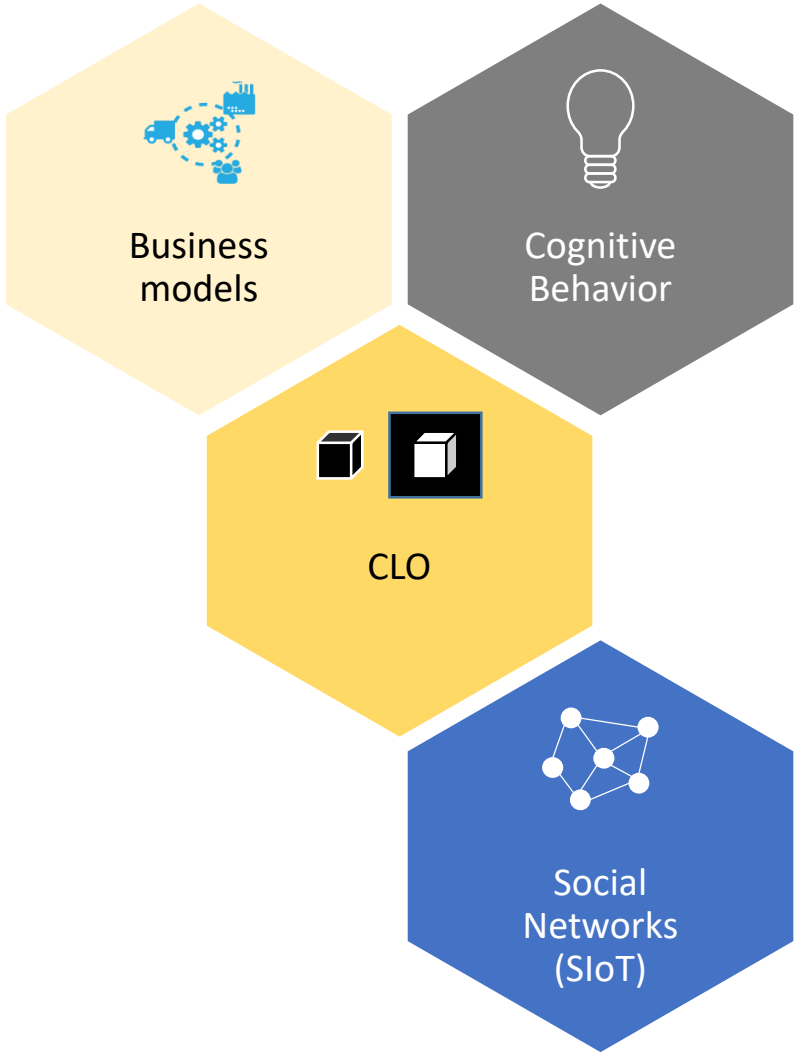
Collaborative and Cognitive Logistics Framework



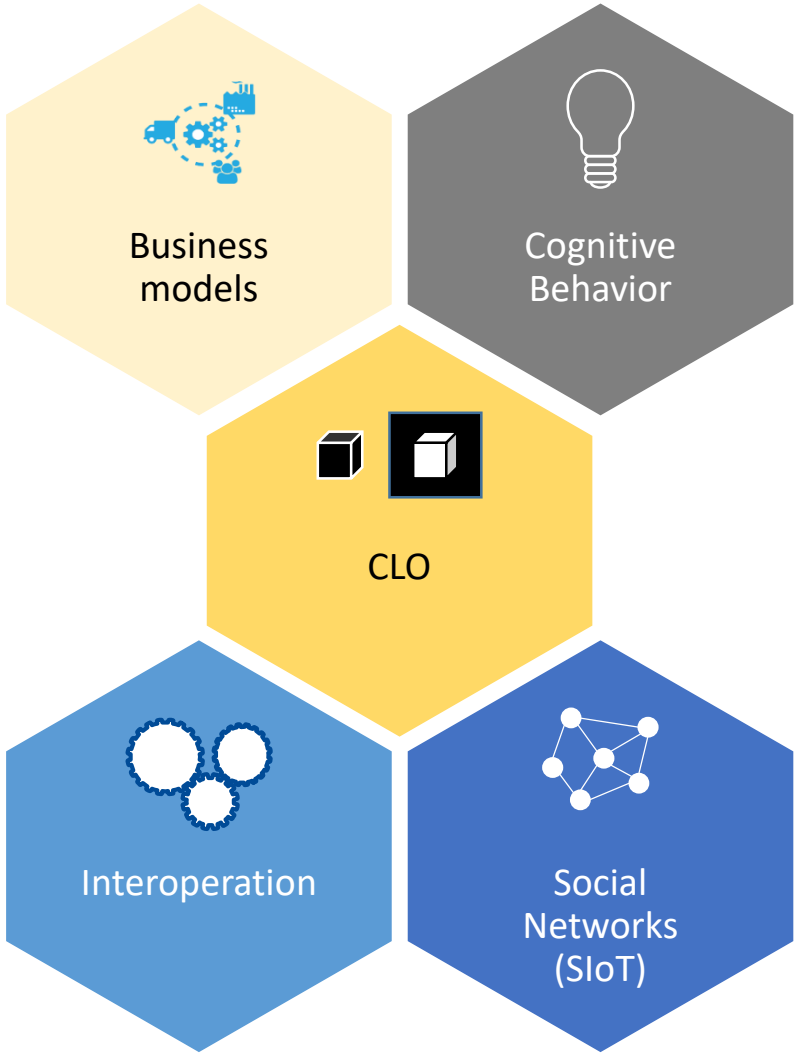
Collaborative and Cognitive Logistics Framework



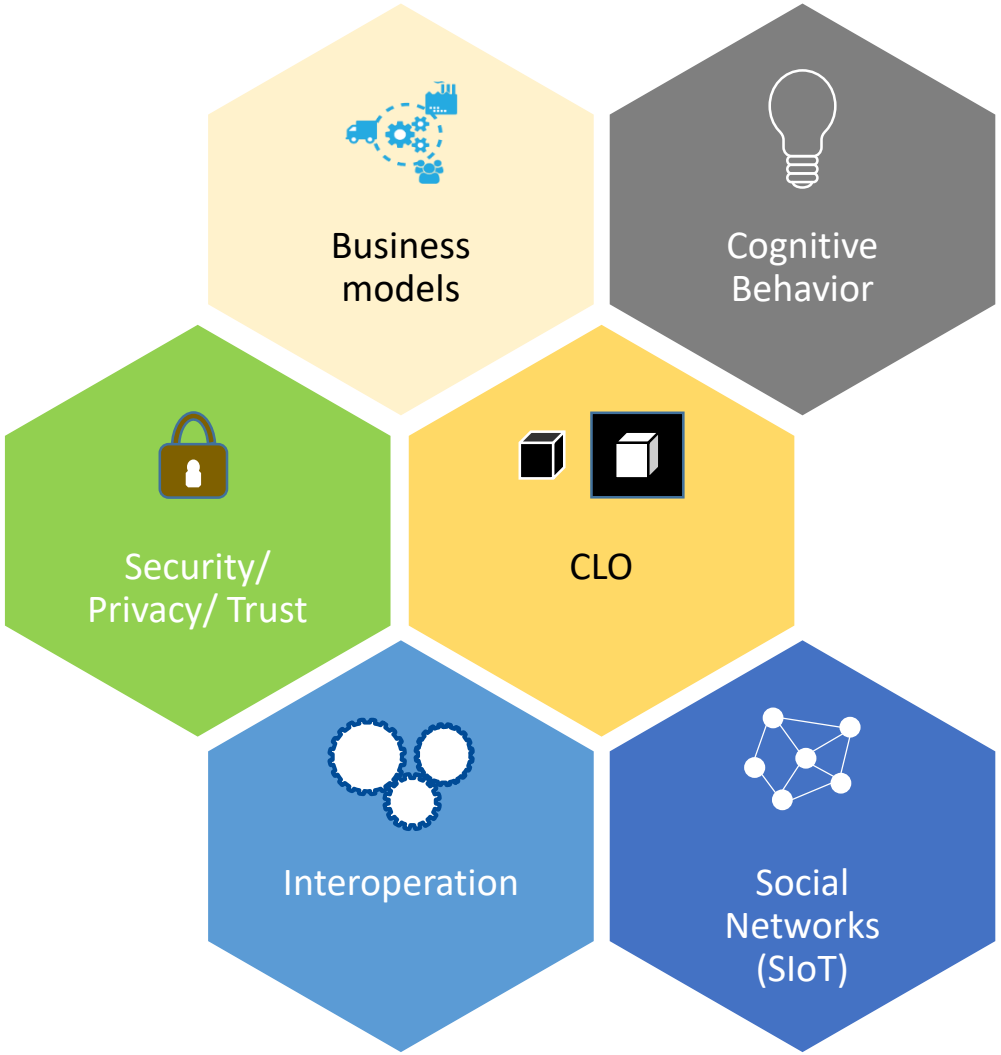
Collaborative and Cognitive Logistics Framework



Collaborative and Cognitive Logistics Framework



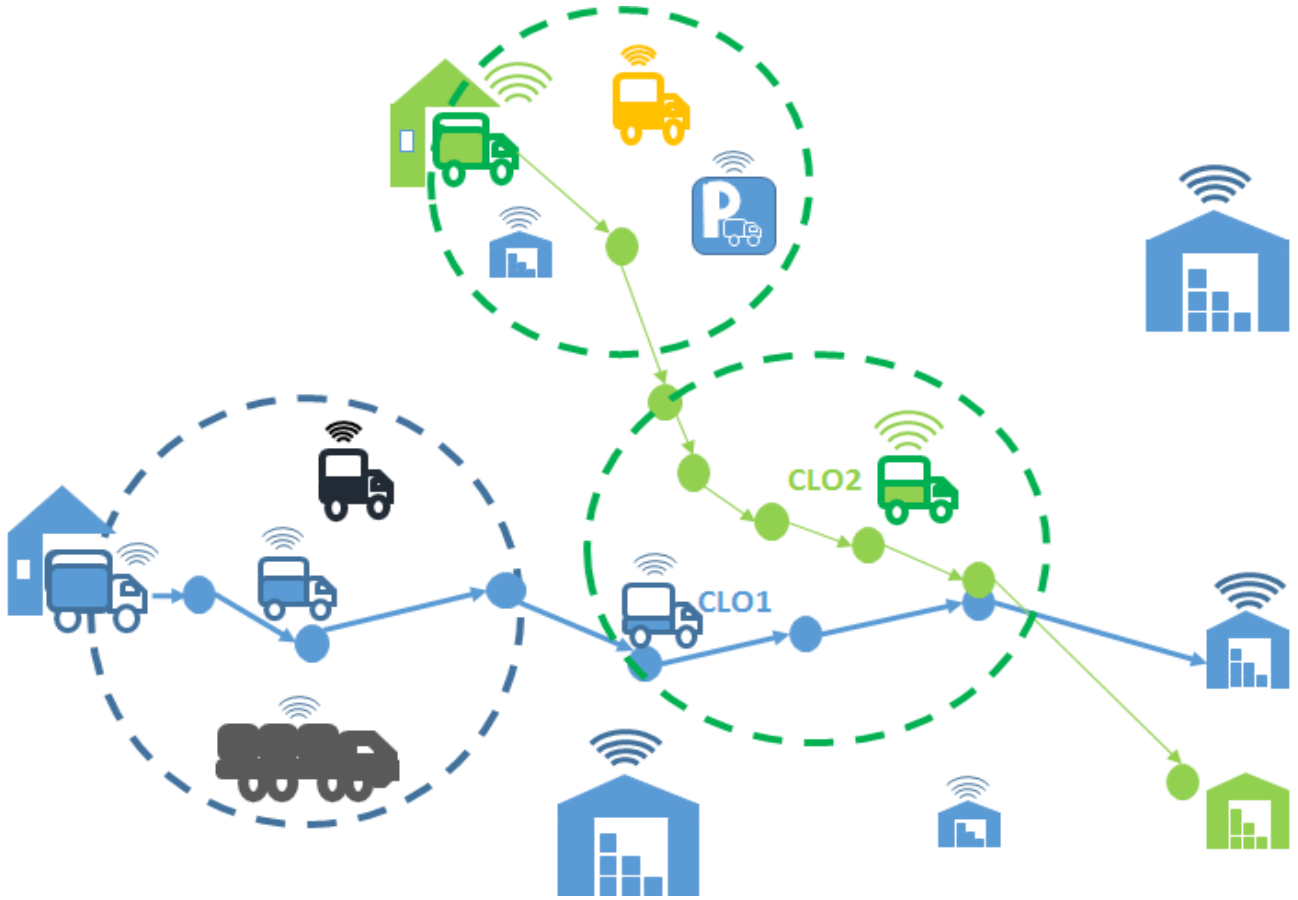
Collaborative and Cognitive Logistics Framework



Collaborative and Cognitive Logistics Framework

How it works

1. A **CLO** is always aware of its status
2. The **CLO** (truck, warehouse, Parking spot, etc.) joins different fixed or ad-hoc social networks
3. Through **Social Internet of Things**, the CLO communicates with its fellow CLOs to negotiate about alternatives in case of an event
4. The **Cognitive Advisor** suggests optimal solutions

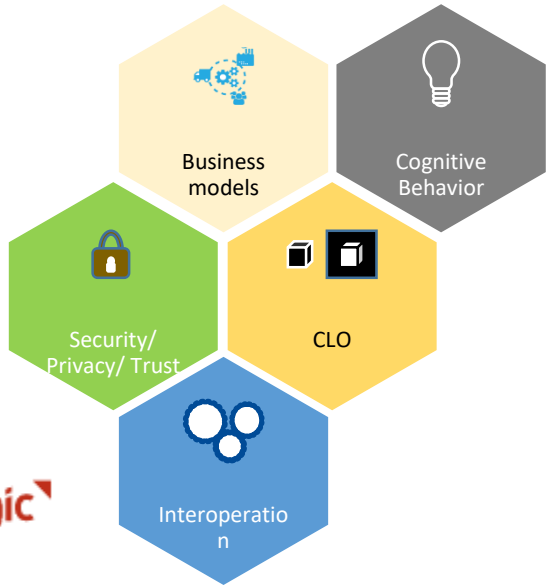


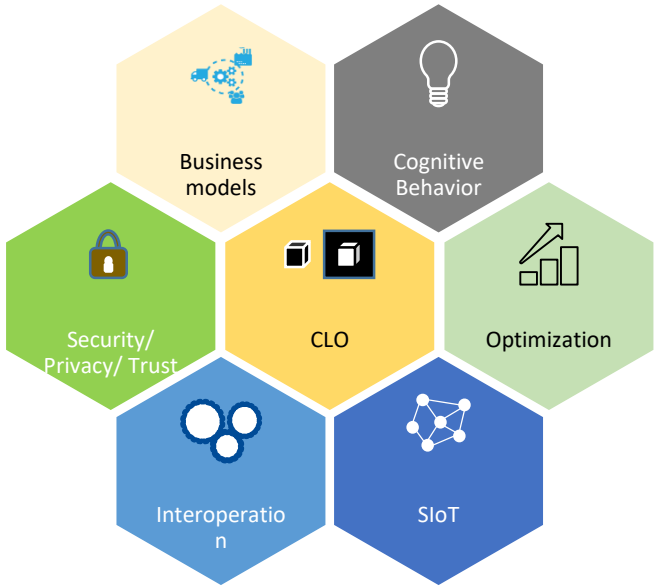
Project Results

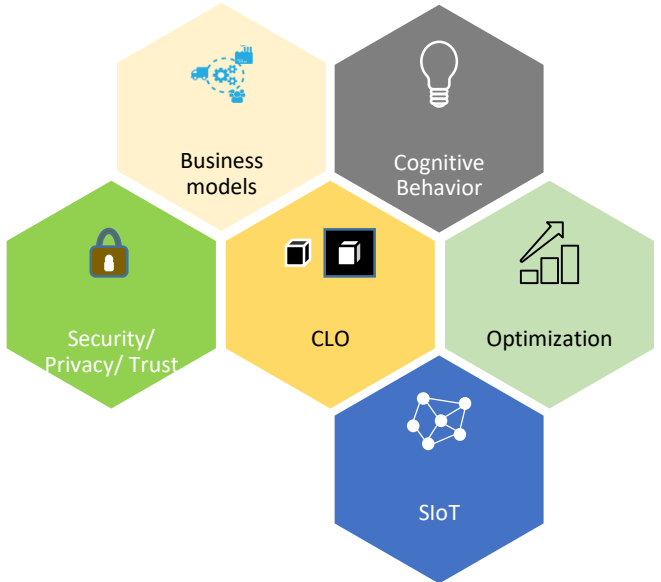
Methodological approach	#1: New cognitive cargo-centric multi-modal transport models
	#2: A reference model for future Cognitive Logistics behavior
Core Services	#3: Cognitive behavior tools with APIs
	#4: Comprehensive framework/tools for security, privacy and trust
	#5: Collaboration platform powered by Social Internet of Things
Tools	#6: Cargo Hitchhiking tool
	#7: Cognitive Advisor tool

A modular approach

- Not a monolithic platform.
- Set of reference models, services and tools to allow for more collaborative and cognitive logistics
- Different implementations and configurations according to customer needs







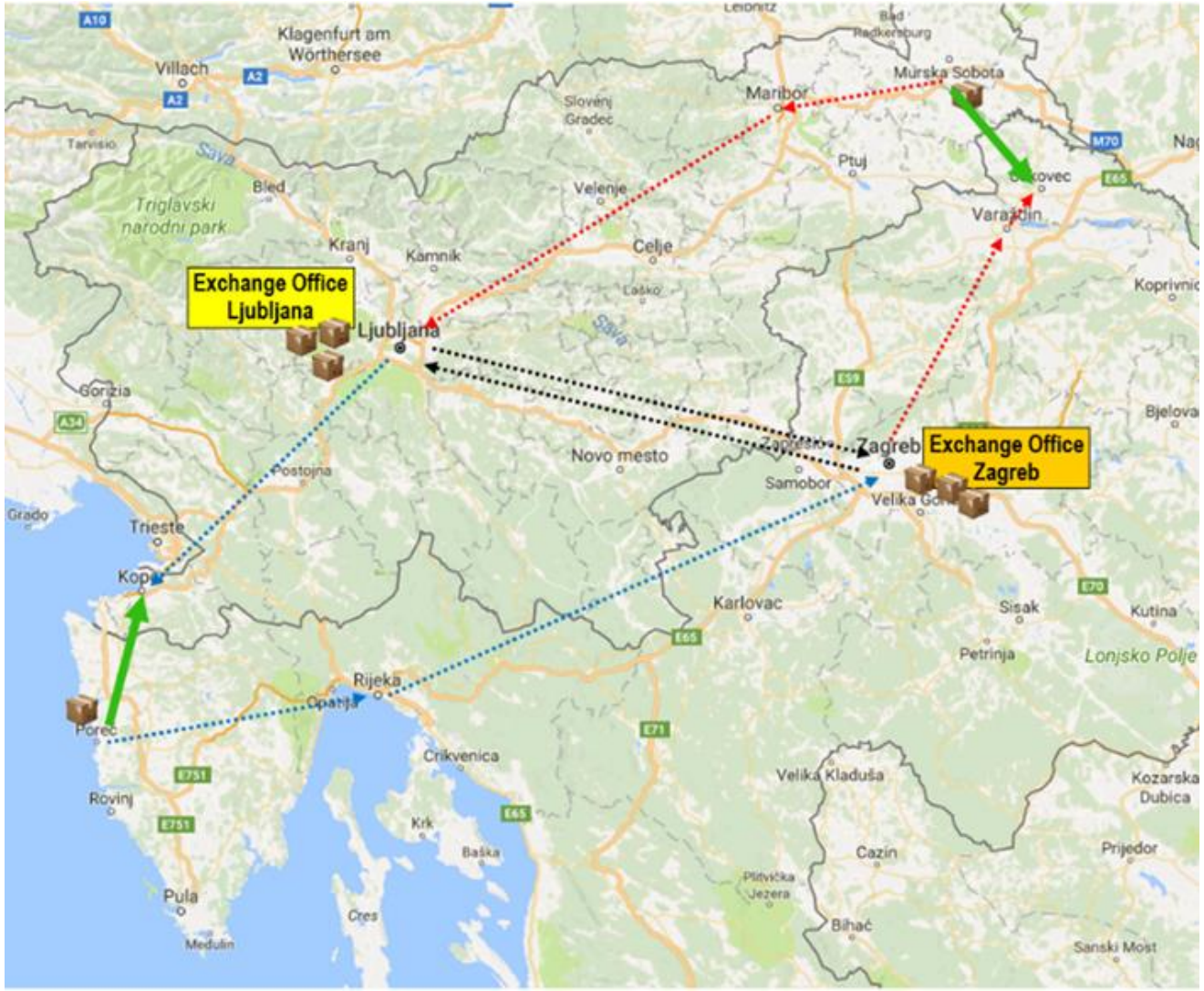
Posta Slovenia-Croatia Post: Cross-country parcel deliveries

Context

e-Commerce parcels from Slovenia to Croatia through Postal Operator services

Problem/ Challenge

- Collaborative parcels tracking
- Optimized Slovenia->Croatia deliveries (currently only though Ljubljana hub)
- Real-time load factor monitoring and improvement



Hellenic Posts: Backbone and urban parcels deliveries

Context

- Backbone logistics for the intra-country transportation (Athens -> Thessaloniki)
- Urban logistics - merging delivery and picking boxes process

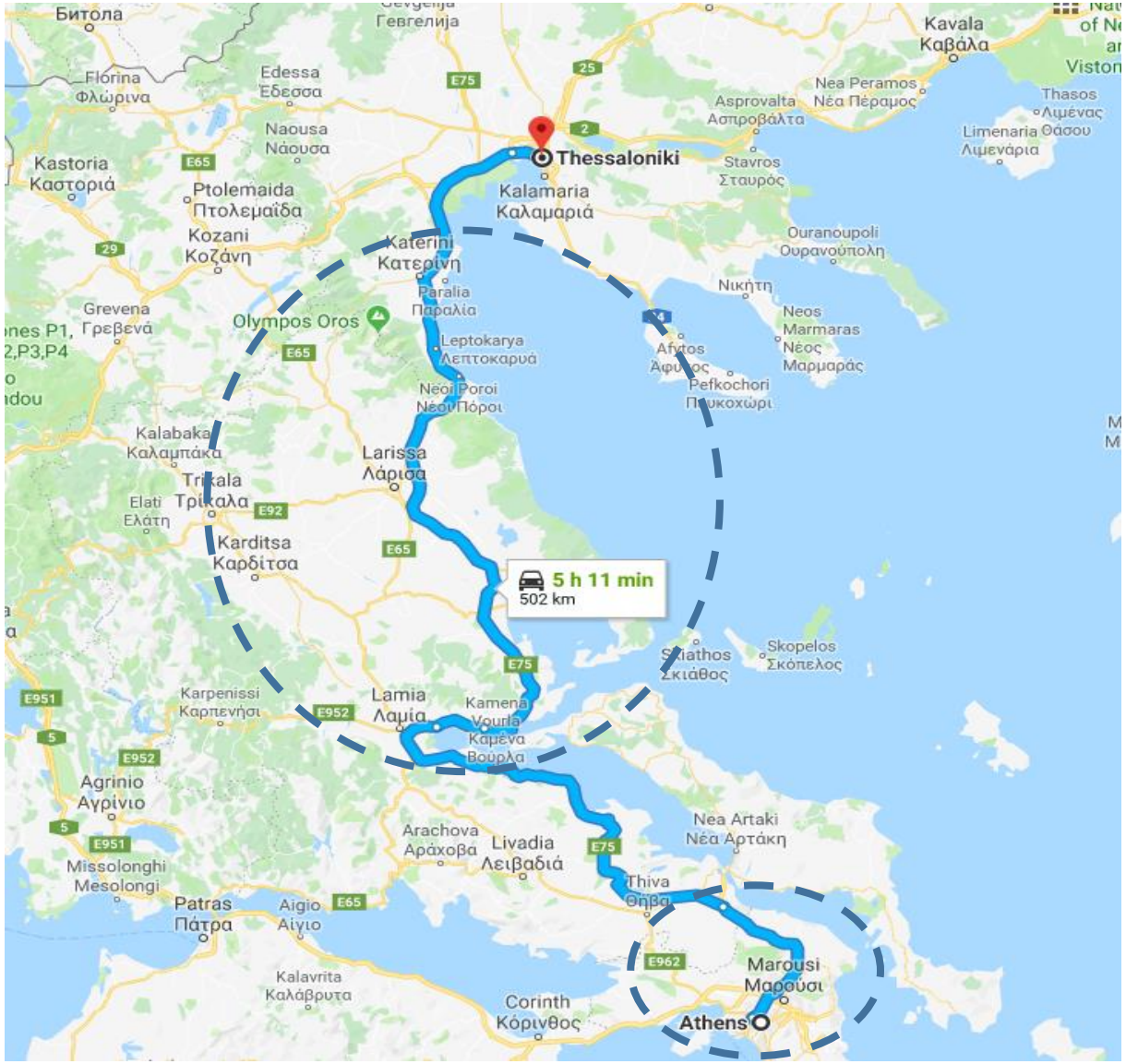
Problem/ Challenge

<u>Backbone logistics:</u>

- Improve leading position with new collaborations
- Load factor optimization

<u>Urban Logistics</u>

- Improve response to ad-hoc events
- Real-time optimization and routing
- New collaborative models (retail,…)



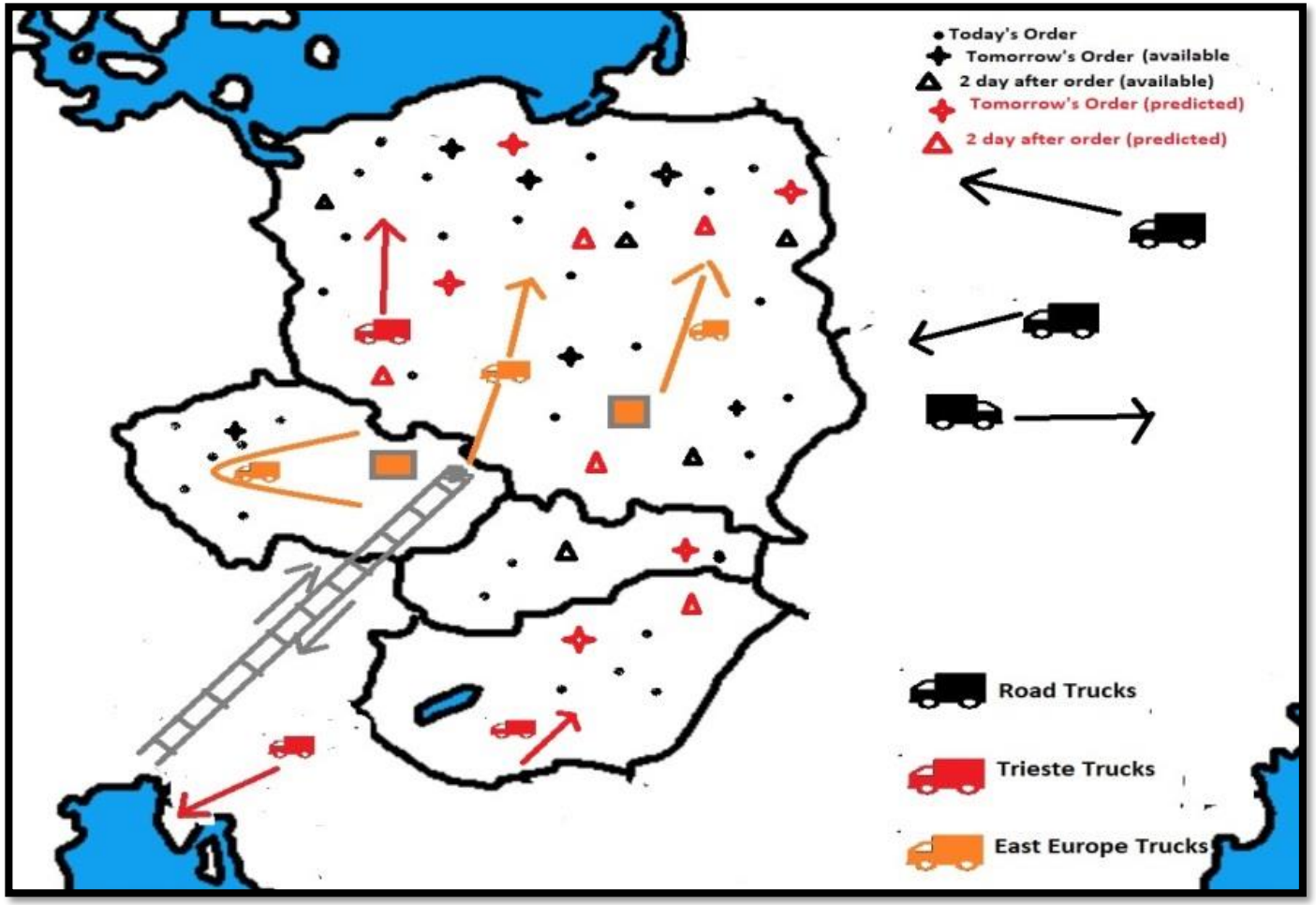
EKOL: Optimized cargo forwarding at Port of Trieste

Context

Cargo transshipment operations from Eastern Europe to Turkey – multimodal operations and forwarding (truck, train, ship) exploiting Trieste-Ostrava railway and Trieste-Lavrio-Yalova port connections

Problem/ Challenge

- Under-utilization of resources
- Legislative restrictions on different truck types
- Cancellations or delays (road or rail network)
- Ad-hoc orders in Eastern Europe
- Predict delays and events in Trieste railway operation
- Optimization of orders' and trucks'allocation



Benefits

COGLO

- Increased load factor
- Reduced costs
- Reduced deliveries - improved assets utilization
- Improve delivery times
- Improve responsiveness
- Improve customer satisfaction

SingularLogic

COGLO

COGnitive Logistics Operations through secure, dynamic and ad-hoc collaborative networks

Project Coordinator

cnit

Technical Coordinator

SingularLogic

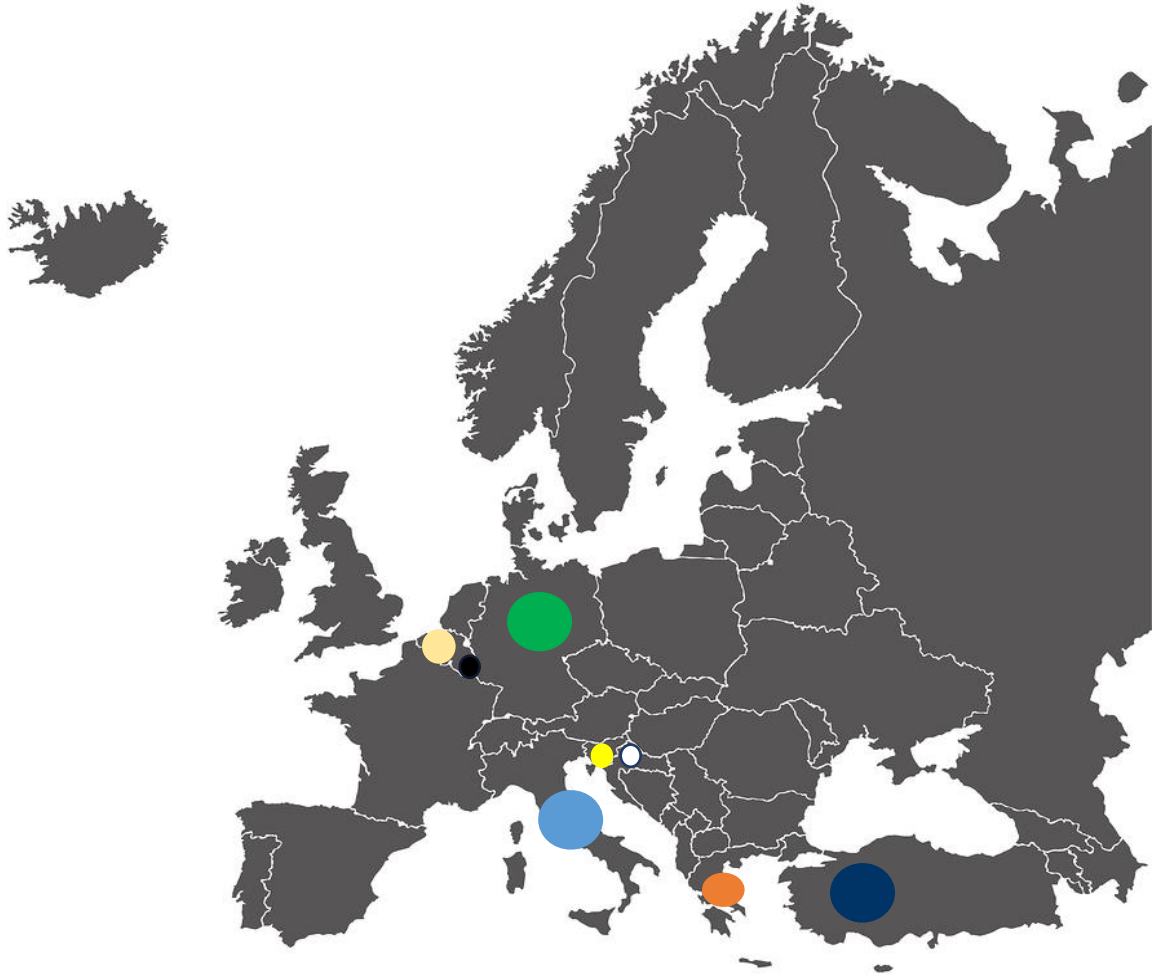
Scientific Coordinator

Jožef Stefan Institute

Project Funding ~ 5mio €

Start Month: June 2018
End Month: May 2021

Duration: 36 months



Technology Providers

- cnit
- SingularLogic
- INTRASOFT INTERNATIONAL
- swarco

Optimization, big data analytics

- NEC
- Jožef Stefan Institute
- ATHENS UNIVERSITY OF ECONOMICS AND BUSINESS

Consultancy

- TRT

Pilots

- Pošta Slovenije
- Hrvatska pošta
- ΕΛΤΑ Hellenic Post
- ekol LOGISTICS 4.0

Associations

- POST EUROP — YOUR LINK TO POSTAL EXPERTISE
- ITS HELLAS Intelligent Transport Systems

Singular Logic

THANK YOU

www.cog-lo.eu | #COG_LO

www.facebook.com/COGLOProject

This project has received funding from the European Union's Horizon 2020 - EU.3.4. SOCIETAL CHALLENGES - Smart, Green And Integrated Transport programme under grant agreement number 769141.