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

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Trends

- eCommerce growth
- Same day delivery
- Universal Postal Sector Transformation
- Globalization

...
Main Challenges

**Load factor optimization**

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

**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.

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

**The growth of ecommerce and Cross-country deliveries**

- Common information models
- Alignment of tools and delivery processes

- Secure, private and trusted networks
- Security and Privacy aware policies
- Blockchain ensuring trust

**“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)
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

Business models

Cognitive Behavior

CLO
Collaborative and Cognitive Logistics Framework

- Business models
- Cognitive Behavior
- CLO
- Social Networks (SIoT)
Collaborative and Cognitive Logistics Framework

- Business models
- Cognitive Behavior
- Security/Privacy/Trust
- Interoperation
- Social Networks (SIoT)
Collaborative and Cognitive Logistics Framework

- Business models
- Cognitive Behavior
- Security/ Privacy/ Trust
- Interoperation
- Social Networks (SIoT)
- Optimization
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

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<th>Methodological approach</th>
<th>#1: New cognitive cargo-centric multi-modal transport models</th>
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<td>#2: A reference model for future Cognitive Logistics behavior</td>
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<td>Core Services</td>
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<td>#4: Comprehensive framework/tools for security, privacy and trust</td>
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<td>#5: Collaboration platform powered by Social Internet of Things</td>
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<td>Tools</td>
<td>#6: Cargo Hitchhiking tool</td>
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<td>#7: Cognitive Advisor tool</td>
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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 through 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
Backbone logistics:
- Improve leading position with new collaborations
- Load factor optimization

Urban Logistics
- 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

- Increased load factor
- Reduced costs
- Reduced deliveries - improved assets utilization
- Improve delivery times
- Improve responsiveness
- Improve customer satisfaction
COgnitive Logistics Operations through secure, dynamic and ad-hoc collaborative networks

Project Coordinator

cnit

Technical Coordinator

Singular Logic

Scientific Coordinator

Jožef Stefan Institute

Project Funding ~ 5 mio €

Start Month: June 2018
End Month: May 2021
Duration: 36 months

Technology Providers

- cnit
- Singular Logic
- INTRASOFT INTERNATIONAL
- swarco
- NEC
- Jožef Stefan Institute

Consultancy

- TRT
- Pilots
- Pošta Slovenije
- Hrvatska pošta
- EATA
- ekol
- Associations

Optimization, big data analytics

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ITS HELLAS
THANK YOU

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