# Digitalization and Optimization of Railway Last Mile Operation inside ports areas

Riga 27/09/2018

2nd Baltic Ports & Shipping 2018

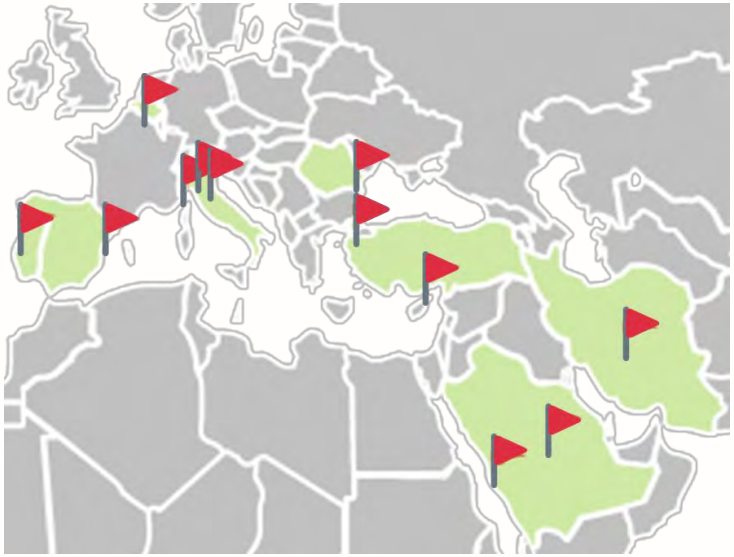
Simone Siria

# Index

- Rail Freight scenario in the Baltic Region
- Rail Last Mile Management Model:
  - Operative Level
  - Basic SW solution
  - Evoluted SW solution
  - Optimization SW solution
- Future Roadmap

# CIRCLE - GEOGRAPHICAL PRESENCE

Circle operates, through branch and representative offices, both in Europe and Middle East and numbers a network of partners for local geographical alliances in order to offer consultancy and innovative solutions enriched with the contribution of complementary market leaders, mantaining at the same time a lean and flexible structure.



- **Italy** (Genoa, Milan and Trieste)
- **Belgium** (Bruxelles – also with ADS Insight)
- **Portugal** (Porto - with Magellan)
- **Romania** (Galati - with CN Apdm)
- **Turkey** (Istanbul and Mersin - with AkanSel)
- **Saudi Arabia** (Riyad, Jeddah - with SmartWay)
- **Spain** (Barcelona - with IETS)
- **Iran** (Teheran)

**MAIN NETWORK PARTNERS**

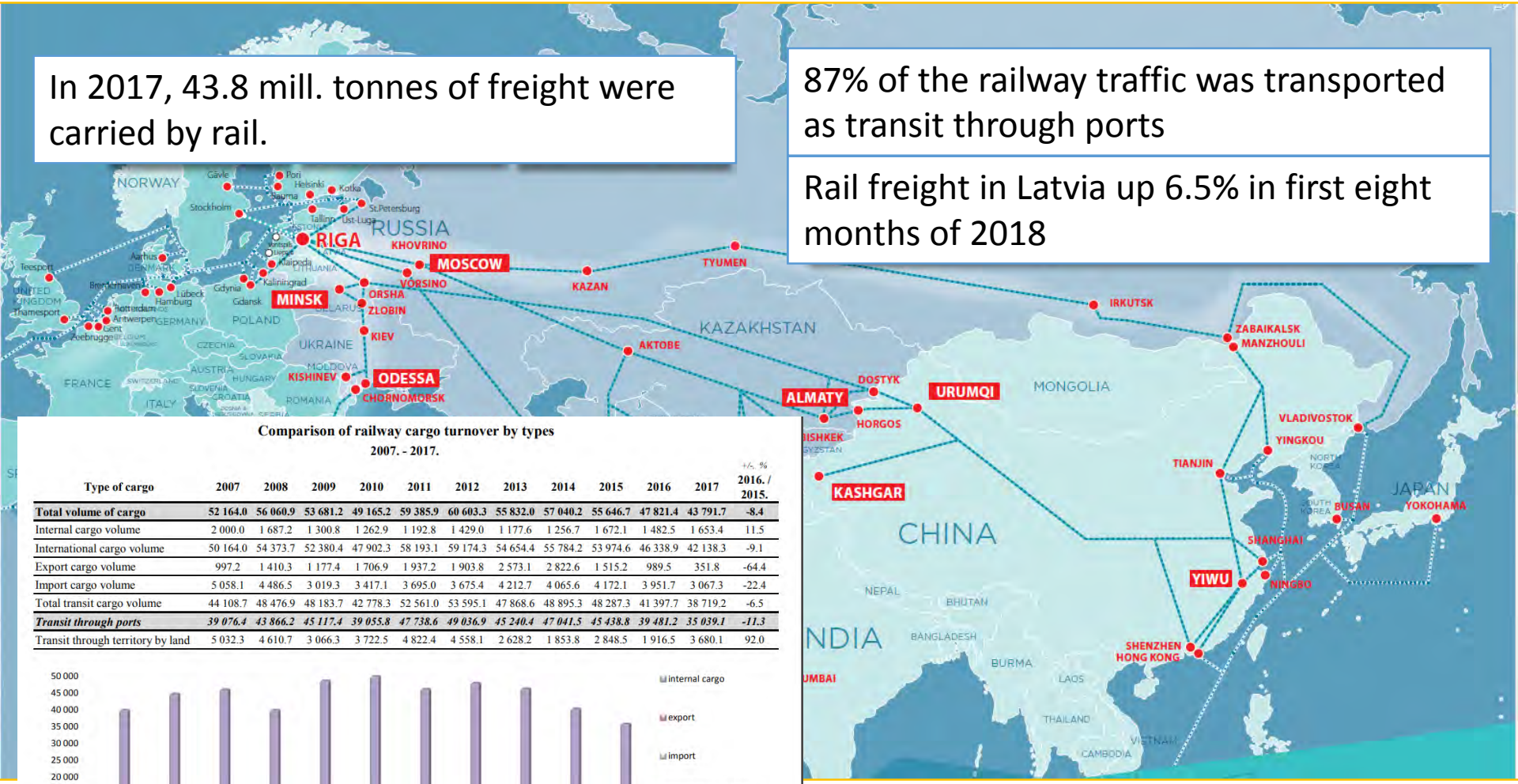
- Alice
- Log@Sea (with Aitek and IB)
- Ticass
- Tecnomar
- Transit

# Rail Cargo Transport in the ports of Latvia

In 2017, 43.8 mill. tonnes of freight were carried by rail.

87% of the railway traffic was transported as transit through ports

Rail freight in Latvia up 6.5% in first eight months of 2018




**Comparison of railway cargo turnover by types**
**2007. - 2017.**

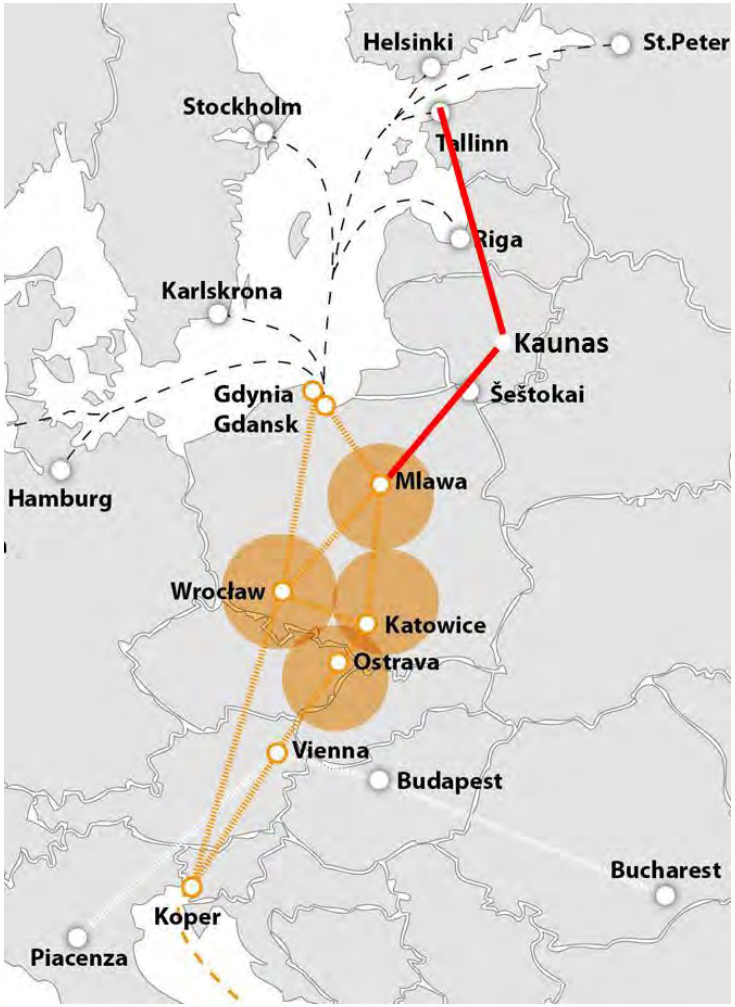
| Type of cargo | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | +/-, % 2016. / 2015. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total volume of cargo** | **52 164.0** | **56 060.9** | **53 681.2** | **49 165.2** | **59 385.9** | **60 603.3** | **55 832.0** | **57 040.2** | **55 646.7** | **47 821.4** | **43 791.7** | **-8.4** |
| Internal cargo volume | 2 000.0 | 1 687.2 | 1 300.8 | 1 262.9 | 1 192.8 | 1 429.0 | 1 177.6 | 1 256.7 | 1 672.1 | 1 482.5 | 1 653.4 | 11.5 |
| International cargo volume | 50 164.0 | 54 373.7 | 52 380.4 | 47 902.3 | 58 193.1 | 59 174.3 | 54 654.4 | 55 784.2 | 53 974.6 | 46 338.9 | 42 138.3 | -9.1 |
| Export cargo volume | 997.2 | 1 410.3 | 1 177.4 | 1 706.9 | 1 937.2 | 1 903.8 | 2 573.1 | 2 822.6 | 1 515.2 | 989.5 | 351.8 | -64.4 |
| Import cargo volume | 5 058.1 | 4 486.5 | 3 019.3 | 3 417.1 | 3 695.0 | 3 675.4 | 4 212.7 | 4 065.6 | 4 172.1 | 3 951.7 | 3 067.3 | -22.4 |
| Total transit cargo volume | 44 108.7 | 48 476.9 | 48 183.7 | 42 778.3 | 52 561.0 | 53 595.1 | 47 868.6 | 48 895.3 | 48 287.3 | 41 397.7 | 38 719.2 | -6.5 |
| ***Transit through ports*** | ***39 076.4*** | ***43 866.2*** | ***45 117.4*** | ***39 055.8*** | ***47 738.6*** | ***49 036.9*** | ***45 240.4*** | ***47 041.5*** | ***45 438.8*** | ***39 481.2*** | ***35 039.1*** | ***-11.3*** |
| Transit through territory by land | 5 032.3 | 4 610.7 | 3 066.3 | 3 722.5 | 4 822.4 | 4 558.1 | 2 628.2 | 1 853.8 | 2 848.5 | 1 916.5 | 3 680.1 | 92.0 |

# Rail Baltica - Port of Riga case

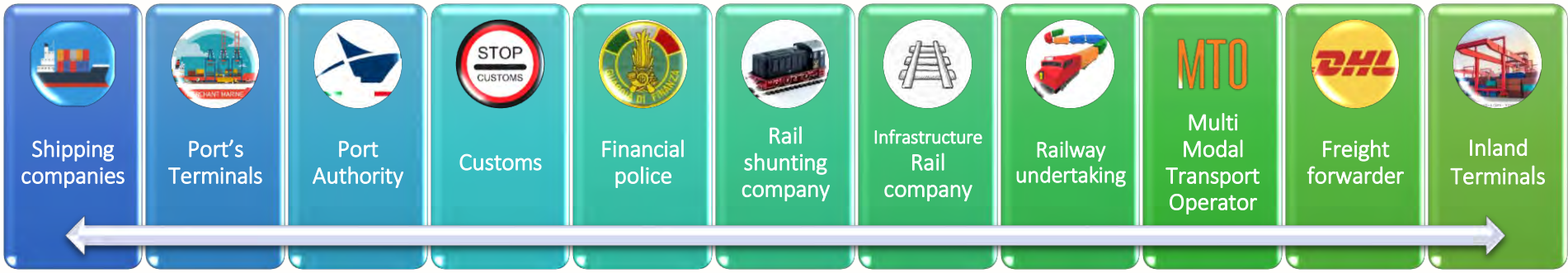
**Rail Baltica** is a greenfield rail transport infrastructure project with a goal to integrate the Baltic States in the European rail network. The port of Riga is connected to Central Europe thanks the **North Sea-Baltic corridor. The european corridor** connects the ports of the eastern shore of the Baltic Sea with ports of the North Sea, situated in **Northern Germany, Belgium and the Netherlands**. The most significant aspect of project is the rail connection among the **Estonia, Latvia and Lithuania** to **Poland** and its **logistics hubs**. It will connect Helsinki, Tallinn, Riga, Kaunas, Milawa. The Baltic part of the Rail Baltica project is referred to as the Rail Baltica Global Project.

The project provides a direct link between the **Baltic Sea** and the **Mediterranean Sea** thanks to the train connection between the port of **Gdynia** (and the subsequent connection with the ports of **Riga** and **Tallin**) and the port of **Koper**.

2 trains per week between Poland and the port of Koper.
Internal rail transit time 30 hours.
3 direct oceanic services a week in the Far East.
Increase in connections between the Mediterranean, North Africa and the Middle East.
Polish export, fruit and vegetables.



# RAIL LAST MILE MANAGEMENT – WHAT IS?



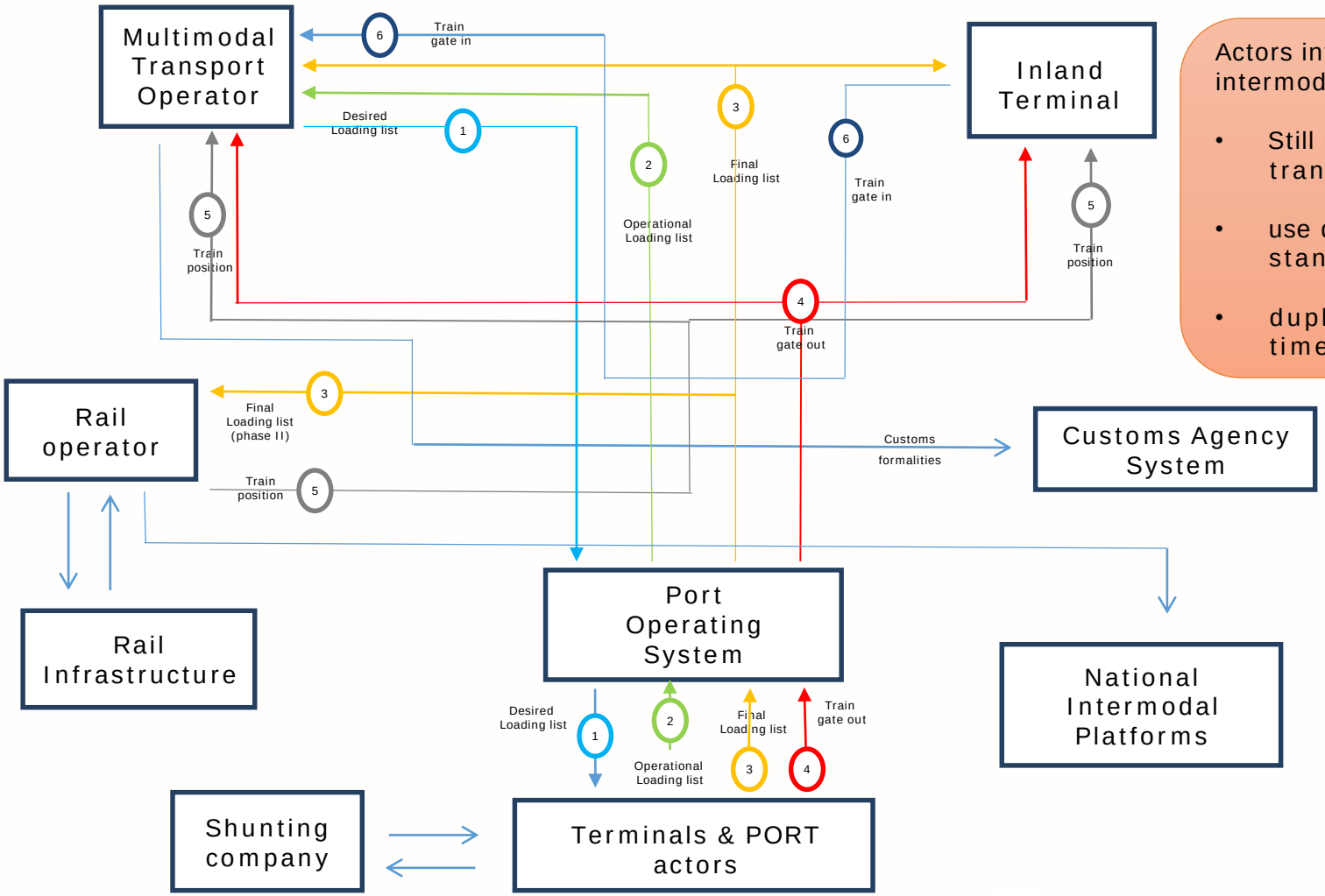

Informatics and informative **interoperability model** among the subjects involved in the optimal **Rail Last Mile management**, considering as last mile the way between **port's and inland terminals.**

Port Terminal Infrastructure

Port Rail Infrastructure

Rail National Infrastructure

# Rail Last Mile - Example of Information Flow complexity




Actors involved in the intermodal transport process:

- Still use Paper transport documents;
- use different standards;
- duplicate and share not timely information.

# Rail Last Mile Management – General overview

**Operative level** — Definition of the **processes in detail**

**Actual SW Scenario** — Analysis of the **AS-IS SW scenario**

**Digitalization and automation SW** — **Digitalization and automation** of information flow

**Optimization SW** — Implementation of **Optimization Tool**

Port Terminal Infrastructure

Port Rail Infrastructure

Rail National Infrastructure

# Rail Last Mile Management – Operative Level

We focused on the main **rail operation** involved in the Rail Last Mile inside the port area

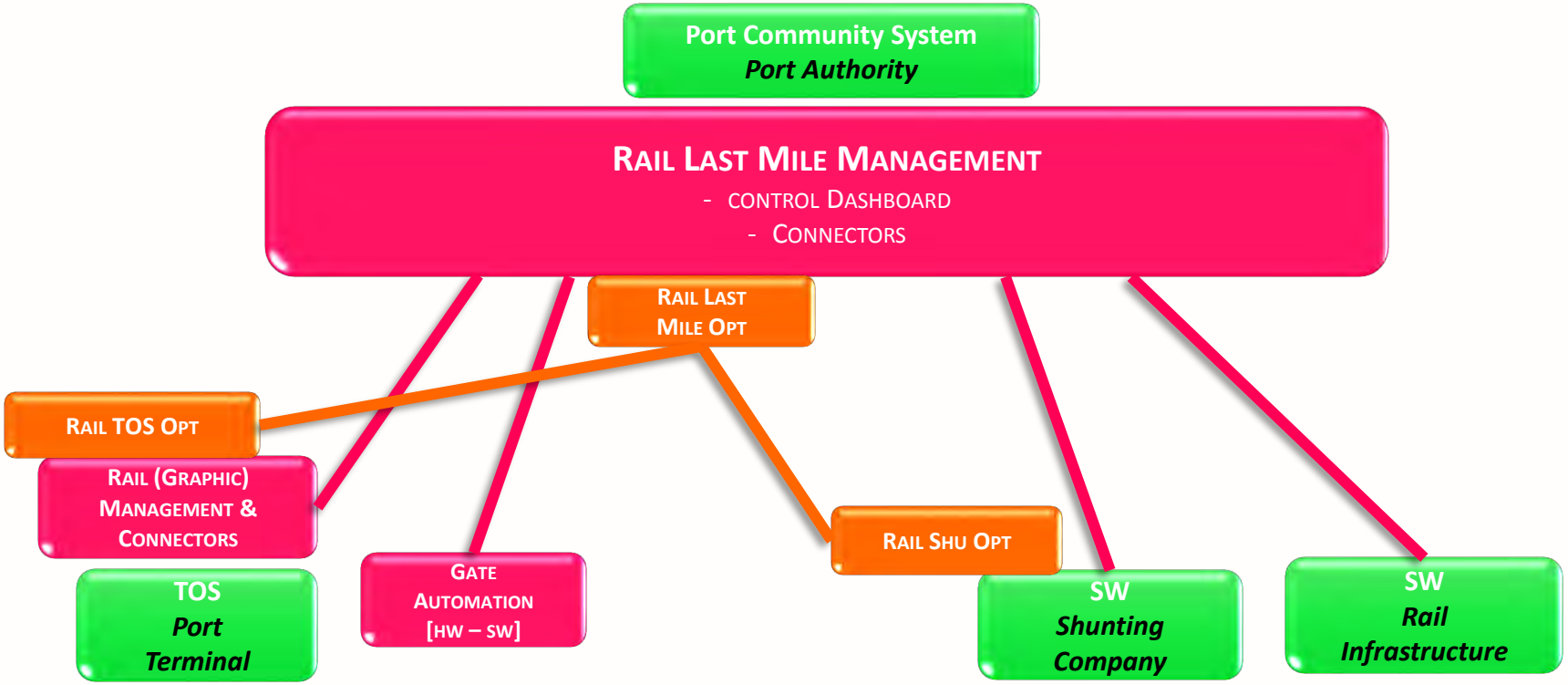
Rail Handling operation inside port terminal → Primary and secondary Shunting operation → Train gate in/out in port area

Port Terminal Infrastructure

Port Rail Infrastructure

Rail National Infrastructure

# Rail Last Mile Management – General SW Overview




Port Terminal Infrastructure

Port Rail Infrastructure

Rail National Infrastructure

# Rail Last Mile Management – Actual SW scenario

## Actual SW scenario

Port Terminal Infrastructure

Port Rail Infrastructure

Rail National Infrastructure

# Rail Last Mile Management - Actual SW scenario

- Did not digitalize all information flows
- Using different standards;
- Sharing not timely information.

**Port Community System** *Port Authority*

**TOS** *Port Terminal*

**SW** *Shunting Company*

**SW** *Rail Infrastructure*

Port Terminal Infrastructure

Port Rail Infrastructure

Rail National Infrastructure

# Rail Last Mile Management – Digitalization & Automation

## Digitalization & Automation SW

Port Terminal Infrastructure

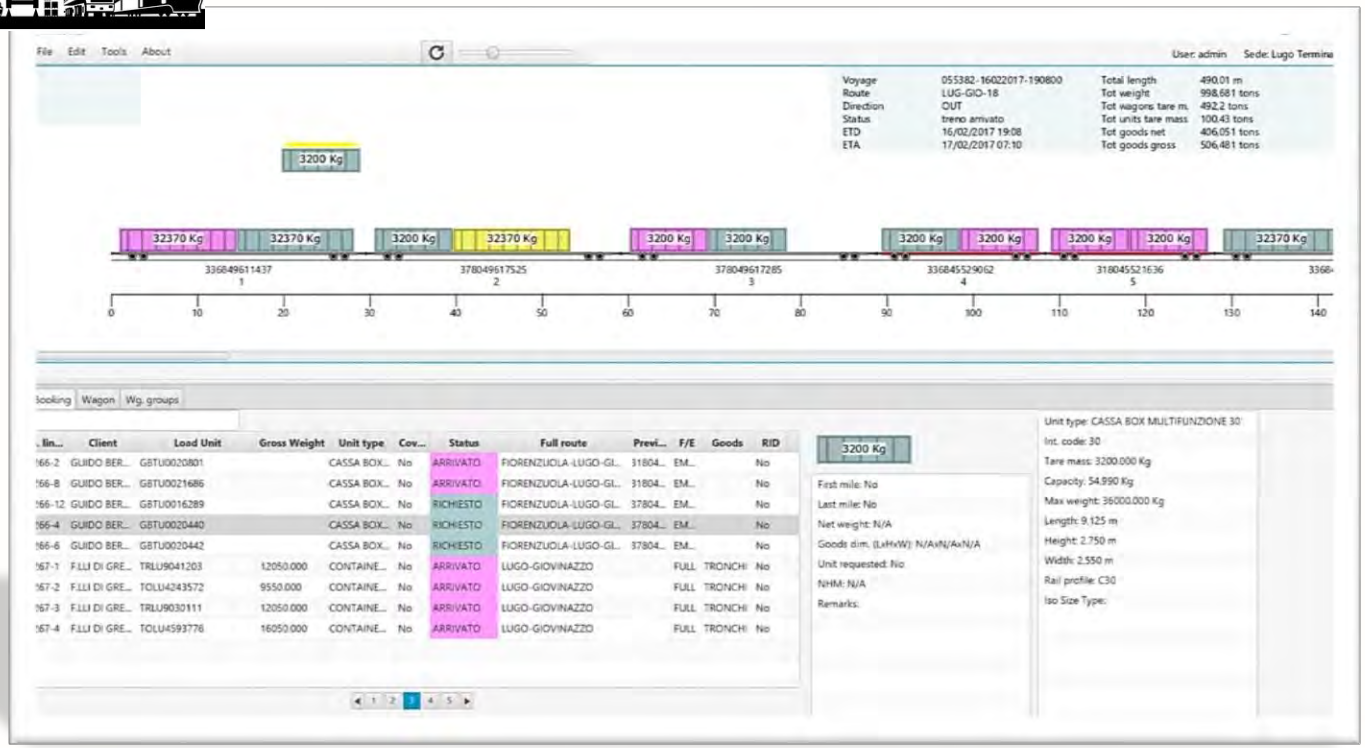
Port Rail Infrastructure

Rail National Infrastructure

# Digitalization & Automation - rail (graphic) management & Connectors

**TOS**
***Port Terminal***

**Rail (Graphic) Management & Connectors**




- Real time status of rail yard
- Easy planning of handling operation
- Digitalized flows to third systems

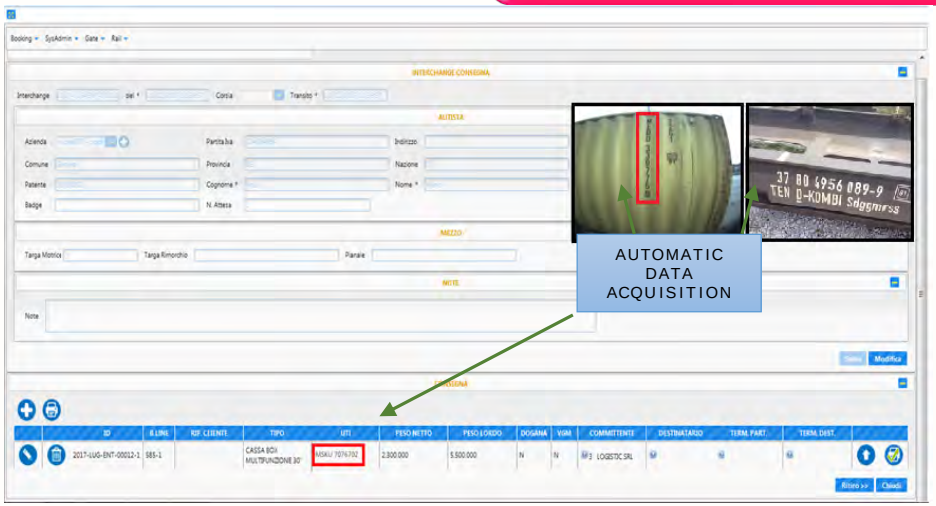
# DIGITALIZATION & AUTOMATION - GATE AUTOMATION

**Port Community System**
***Port Authority***

**GATE AUTOMATION [HW – SW]**

AUTOMATIC DATA ACQUISITION OF TRAIN COMPOSITION, DEMAGE, ETC.

INTEROPERABILITY WITH PORT ACTORS AND CUSTOMS ADMINISTRATION

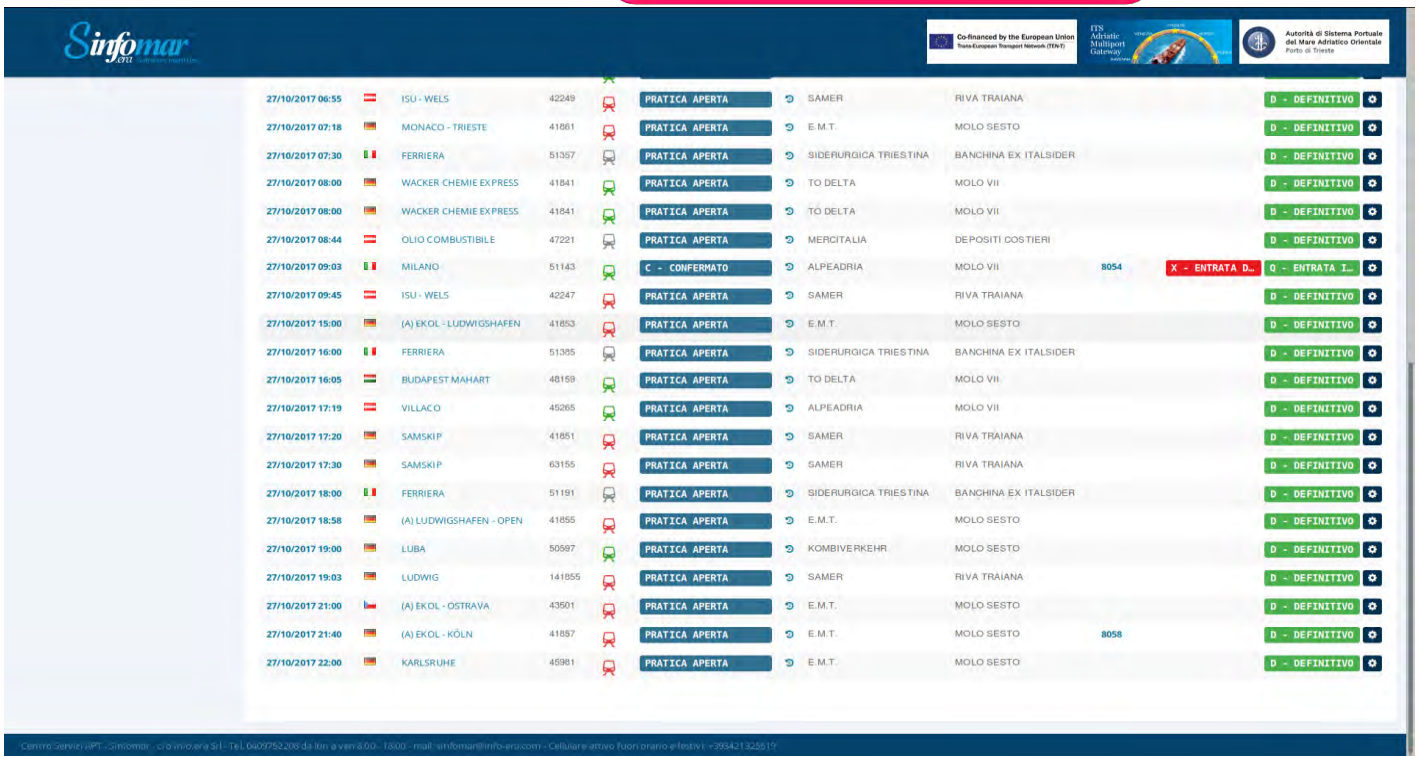



**Port Railway gate infrastructure OCR / RFID**

# Digitalization & Automation - Rail Last Mile Management

**Port Community System**
***Port Authority***

**Rail Last Mile Management**
- Control Dashboard
- Connectors




Real time status of the rail yard inside port

It provides Alert and statistics

Full control over the rail process inside port

# Rail Last Mile Management – Optimization Tools

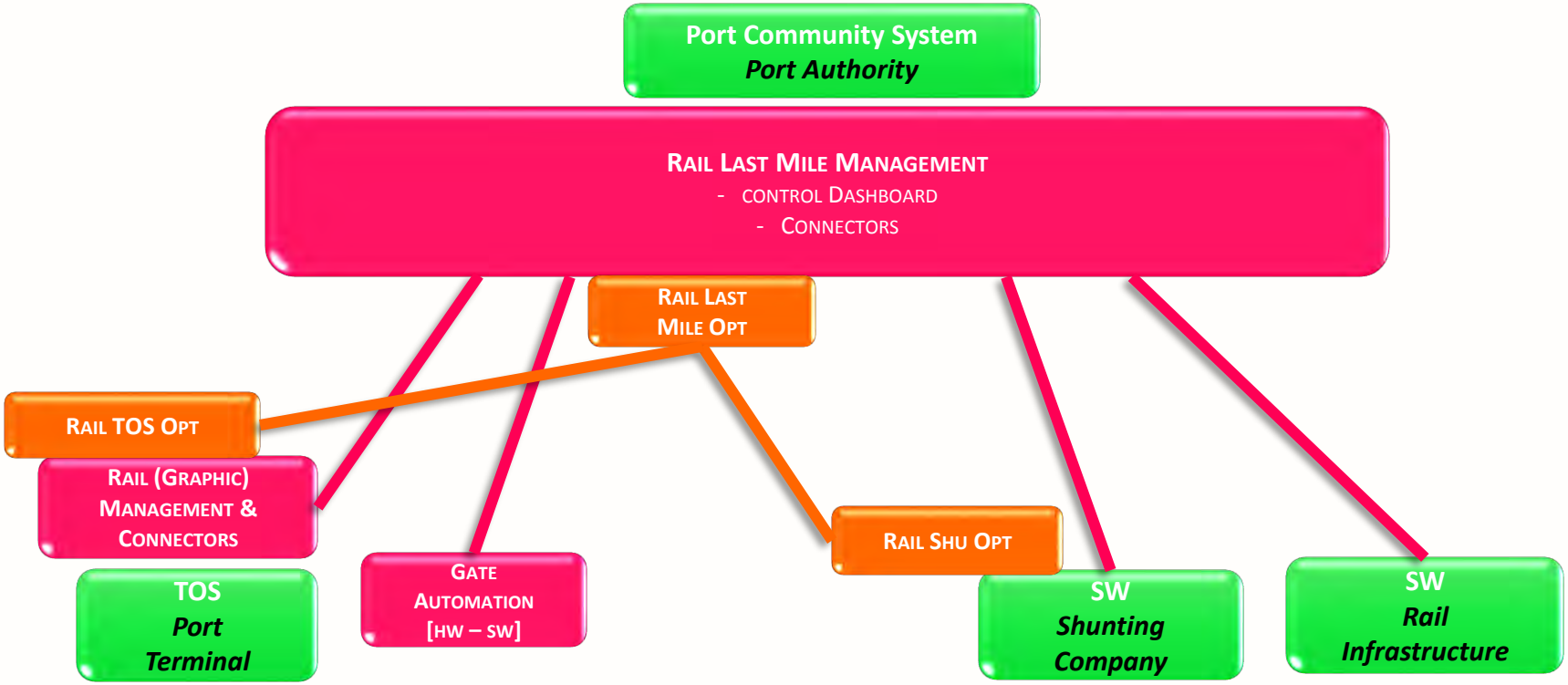
## Optimization Tools

Port Terminal Infrastructure

Port Rail Infrastructure

Rail National Infrastructure

# Rail Last Mile Management – Optimization SW

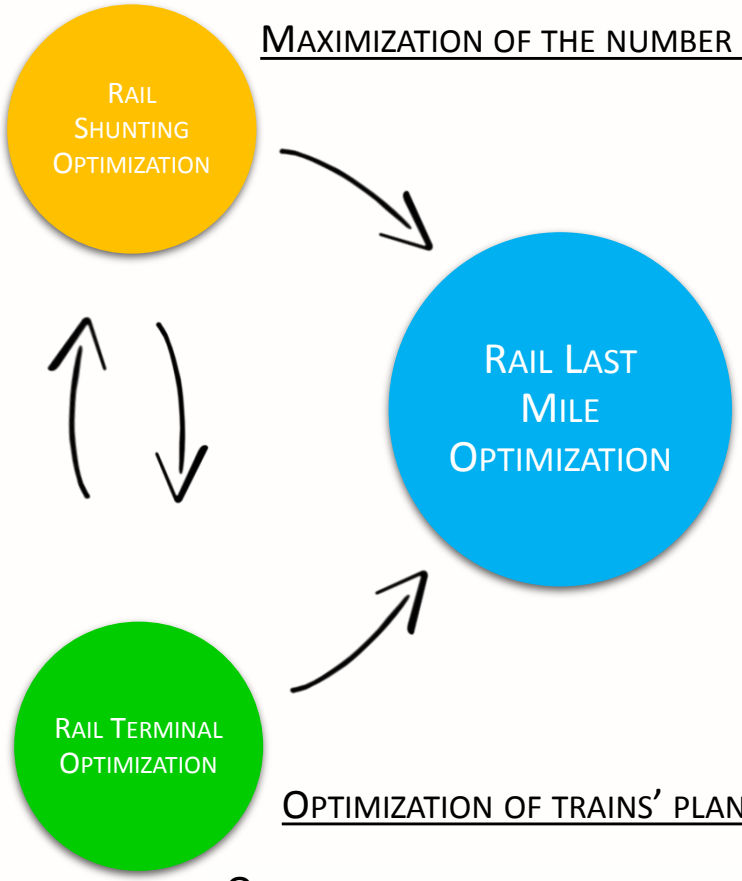



Port Terminal Infrastructure

Port Rail Infrastructure

Rail National Infrastructure

# Rail Last Mile Management – Optimization SW Modules




Maximization of the number of trains to/from the port

Optimization of trains' planning activities

Optimization of infrastructure's utilization

Rail Last Mile Optimization tool provide the optimized solution in case of conflicts

- Reducing Port Congestion
- Reducing dwell time
- Increasing train operated

# MILOS RAIL LAST MILE MANAGEMENT ROADMAP

## Roadmap 2020

UNIVERSITÀ DEGLI STUDI DI GENOVA

C.I.E.L.I.

SCIENTIFIC RESEARCH ACTIVITIES IN PROGRESS

MILOS OPTIMIZATION

BIG DATA

AI

DATA ANALYSIS

MILOS FOR BLOCKCHAIN

SUPPLY CHAIN 4.0 OPTIMIZATION

# CONCRETE PROPOSAL

Within the next few months the ***digitalisation and optimisation of rail last mile transport operations and documents*** are further used and tested in ongoing EU projects and also in new CEF proposals

***More than 28 international actors*** of the Rail Transport industry have already signed an Expression of Interest

There are concrete opportunities for ***Baltic Sea Region ports and logistic actors***.

**Deadline for joining as stakeholder *31.10.2018***

**visit us @ our stand 17**

**Contact us at** siria@circletouch.eu **Or**