



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

Gdynia 23/10/2019

3rd Baltic Ports & Shipping 2019

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# CIRCLE - GEOGRAPHICAL PRESENCE



- **Italy** (Genoa, Milan and Trieste)
- **Belgium** (Bruxelles – also with ADS Insight)
- **Portugal** (Porto - with Magellan)
- **Romania**
- **Bulgaria**
- **Turkey** (Istanbul, Ankara and Mersin)
- **Saudi Arabia** (Riyad, Jeddah)
- **Spain** (Barcelona)

## MAIN NETWORK PARTNERS

- **Log@Sea** (with Aitek and IB)
- **Alice**
- **Innovazione Energia Ambiente e Sviluppo Sostenibile**
- **Distretto Ligure delle Tecnologie Marine**
- **TRANSIT**
- **Competence Center Industry 4.0**

# Index

- Rail Freight scenario in Poland
- Rail Last Mile Management Model:
  - Operative Level
  - Actual SW Scenario
  - Digitalisation and Automation
  - Optimization SW solution
- Future Roadmap

# RAIL IMPROVEMENT WORKS AT GDAŃSK AND GDYNIA PORTS

The intermodal traffic on the Polish railway is growth of **14.7% in 2017** and of **17% in 2018**.

In September 2019, the **EUR 600 million** railway access projects at Gdańsk and Gdynia ports have started: in particular

For the **Port of Gdansk**, the project on improving the infrastructure of rail access to the port of Gdańsk includes:

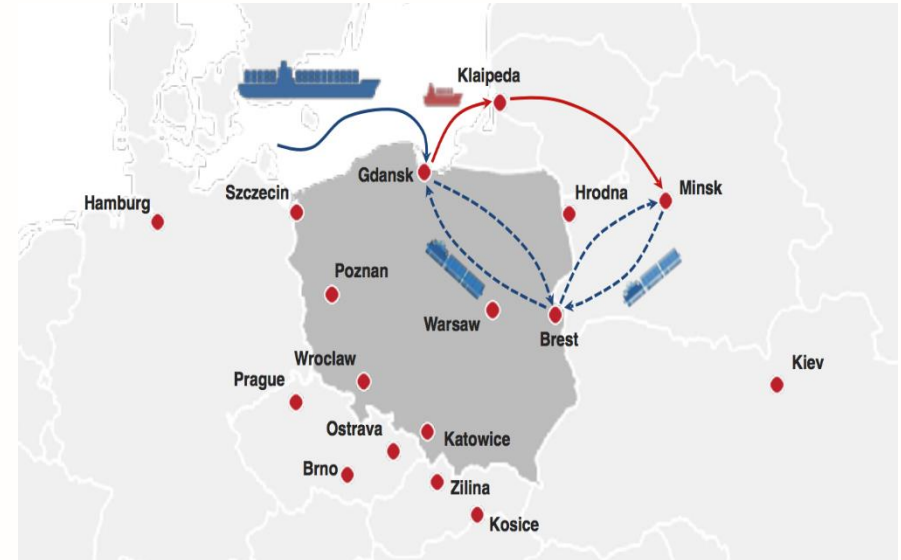
- reconstruction of over 70 km of tracks,
- 13 level crossings and pedestrian crossing
- Replacement of 221 turnouts
- Modernisation of three stations
- Electrification works

The **Port of Gdynia** will improve its capacity and will shorten the travel time:

- 115 km of tracks will be reconstructed
- 356 turnouts will be installed
- Electrification works will be performed at the port
- railway bridge will be also reconstructed

# NEW RAILWAY CONNECTIONS

The port of Gdansk is also preparing two direct rail link, one with **Zilinia** and the other with **Minsk** to tap into the booming rail freight traffic between China & Europe



Since October 2019, the **Baltic Train**, will offer a new railway connection for the transport of containers between Małaszewicze and the ports of Gdańsk and Gdynia. The train serves customers in the Baltic States, Scandinavia and the UK, offering not just container yard solutions, but also a full door-to-door service for one fixed price.

# FUTURE RAILWAY INFRASTRUCTURE PROJECTS FOR POLAND

Poland is improving and actively investing in railway infrastructure:

the Polish national railway program up to 2023, estimated at **€ 15.5 billion**, is a modernization program that will improve rail freight connections within ports. A total of **18,000 km** of railway track will be modernised

Among the railway infrastructure projects, one of the most important project is the new bridge over the **Bug River** that marks the border between Poland and Belarus



Other improvements regarding:

- The extension of Kobylany station in 2019-2023
- The construction of nine tracks at Terespol broad-gauge station in 2018-2023
- The construction of ten tracks at Biała Podlaska Towarowa station in 2018-2020.



# 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

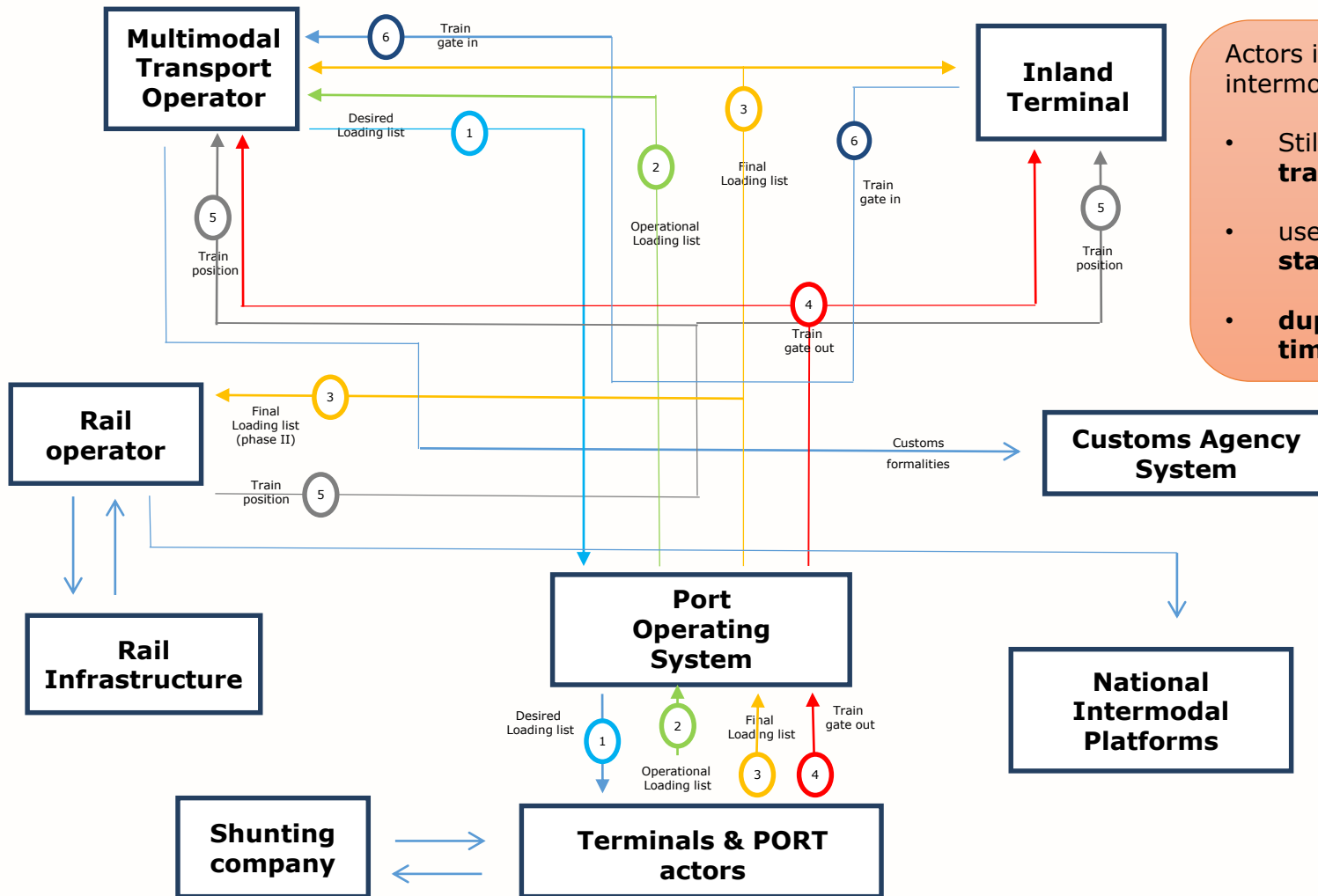


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# RAIL LAST MILE - EXAMPLE OF INFORMATION FLOW COMPLEXITY



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

1. OPERATIVE LEVEL

Definition of the **processes in detail**

2. ACTUAL SW SCENARIO

Analysis of the **AS-IS SW scenario**

3. DIGITALIZATION AND AUTOMATION SW

**Digitalization and automation** of information flow

4. OPTIMIZATION SW

Implementation of **Optimization Tool**



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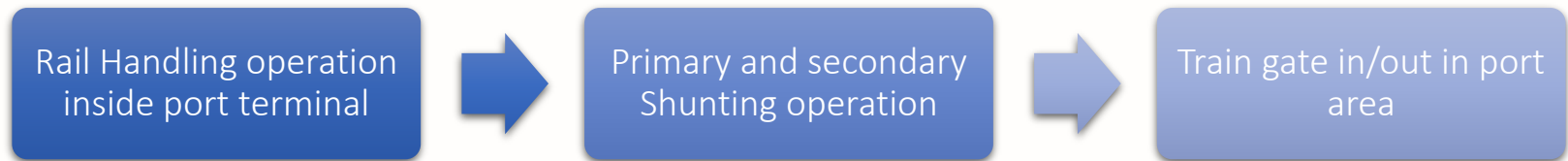
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# RAIL LAST MILE MANAGEMENT – 1. OPERATIVE LEVEL

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



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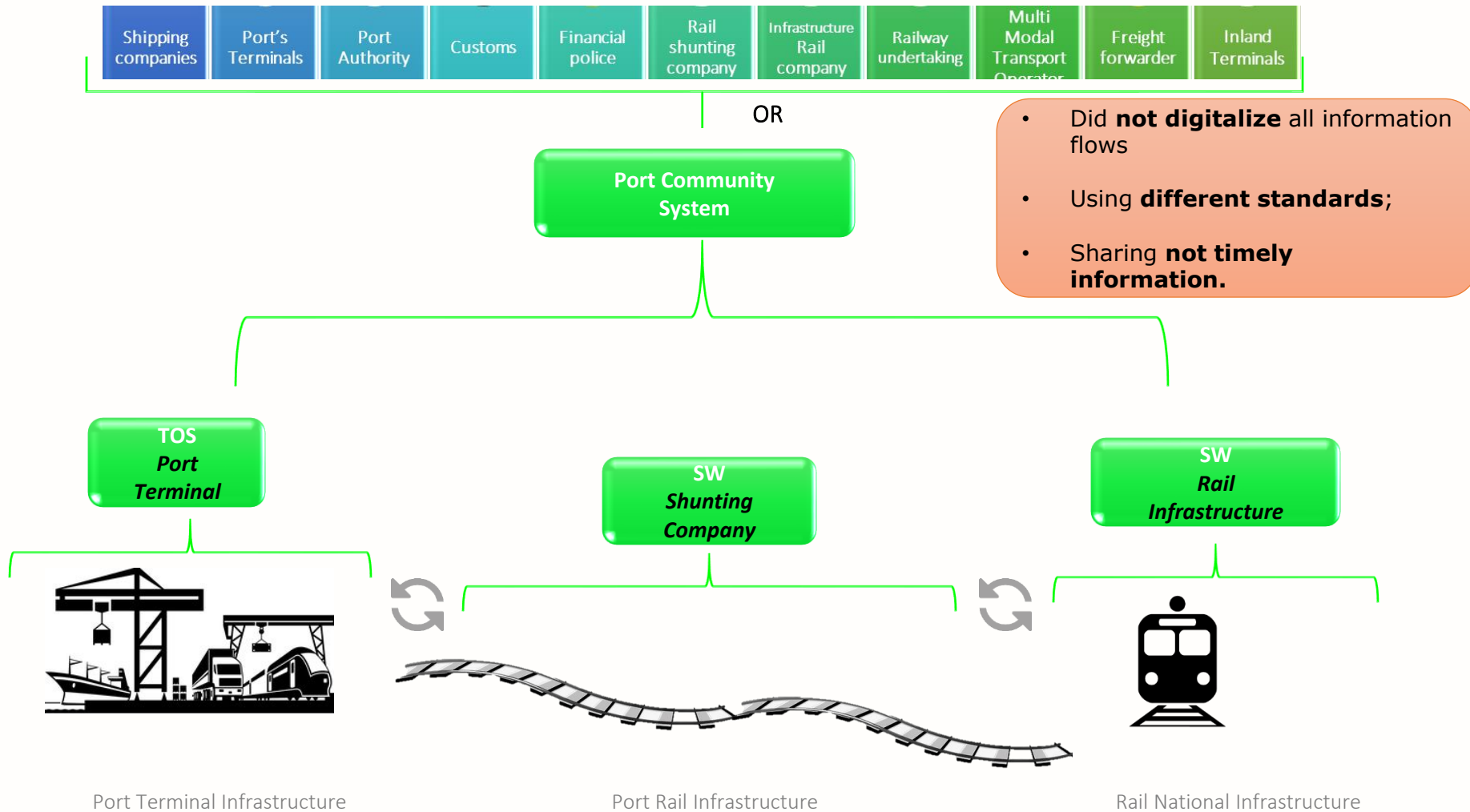


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# RAIL LAST MILE MANAGEMENT – 2. ACTUAL SW SCENARIO



# RAIL LAST MILE MANAGEMENT – 3. DIGITALIZATION & AUTOMATION

## DIGITALIZATION & AUTOMATION SW



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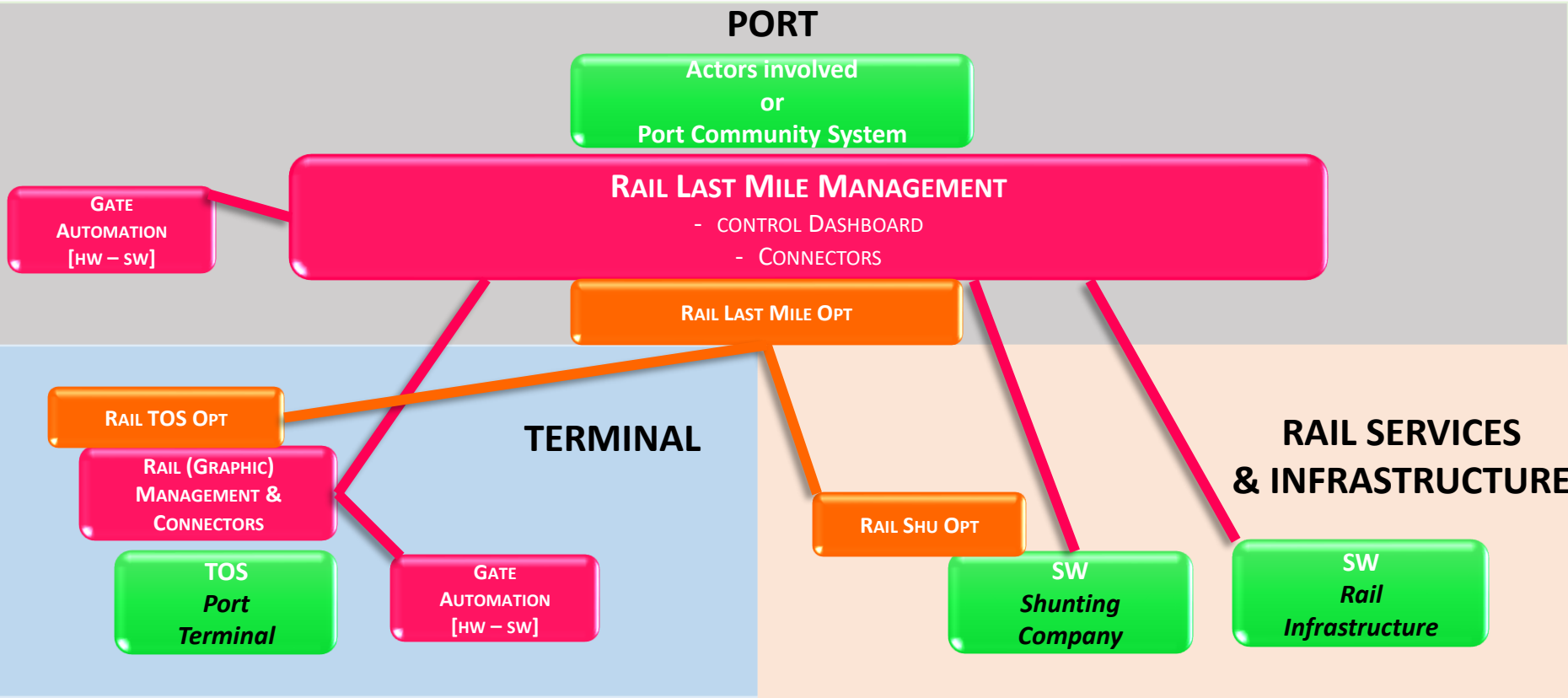


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# 3A. GENERAL SW OVERVIEW



## Legenda:

- SW present in the AS-IS Scenario
- Digitalised modules implemented by us
- Optimisation tools

# 3B.RAIL LAST MILE MANAGEMENT

PORT

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

The screenshot displays a control dashboard for rail last mile management. It features a table with columns for date and time, origin, train name, arrival status, destination, and departure status. The status indicators include 'PRATICA APERTA' (Open Practice) and 'D - DEFINITIVO' (Definitive). A specific entry for 'MILANO' at 09:03 shows a status of 'C - CONFERMATO' (Confirmed) and 'X - ENTRATA D.' (Departure).

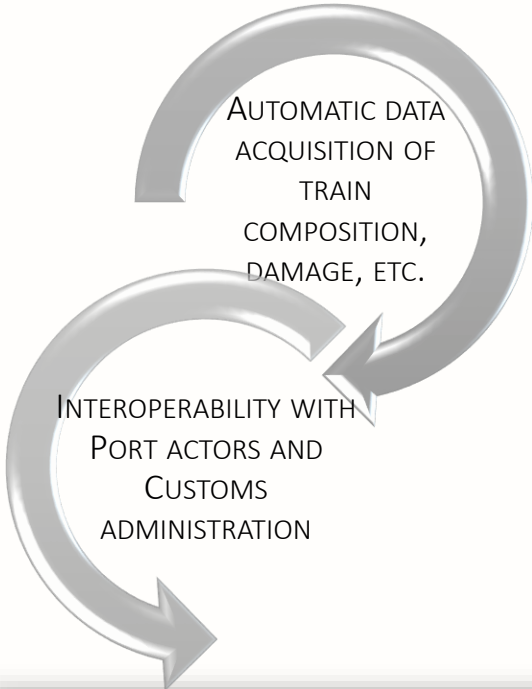
Date/Time	Origin	Train Name	Arrival Status	Destination	Departure Status	
27/10/2017 06:55	ISU - WELS	42249	PRATICA APERTA	SAMER	RIVA TRIANA	D - DEFINITIVO
27/10/2017 07:18	MONACO - TRIESTE	41861	PRATICA APERTA	E.M.T.	MOLO SESTO	D - DEFINITIVO
27/10/2017 07:30	FERRIERA	51357	PRATICA APERTA	SIDERURGICA TRIESTINA	BANCHINA EX ITALSIDER	D - DEFINITIVO
27/10/2017 08:00	WACKER CHEMIE EXPRESS	41841	PRATICA APERTA	TO DELTA	MOLO VII	D - DEFINITIVO
27/10/2017 08:00	WACKER CHEMIE EXPRESS	41841	PRATICA APERTA	TO DELTA	MOLO VII	D - DEFINITIVO
27/10/2017 08:44	OLIO COMBUSTIBILE	47221	PRATICA APERTA	MERCITALIA	DEPOSITI COSTIERI	D - DEFINITIVO
27/10/2017 09:03	MILANO	51143	C - CONFERMATO	ALPEADRIA	MOLO VII 8054	X - ENTRATA D. Q - ENTRATA I.
27/10/2017 09:45	ISU - WELS	42247	PRATICA APERTA	SAMER	RIVA TRIANA	D - DEFINITIVO
27/10/2017 15:00	(A) EKOL - LUDWIGSHAFEN	41853	PRATICA APERTA	E.M.T.	MOLO SESTO	D - DEFINITIVO
27/10/2017 16:00	FERRIERA	51385	PRATICA APERTA	SIDERURGICA TRIESTINA	BANCHINA EX ITALSIDER	D - DEFINITIVO
27/10/2017 16:05	BUDAPEST MAHART	48159	PRATICA APERTA	TO DELTA	MOLO VII	D - DEFINITIVO
27/10/2017 17:19	VILLACO	45265	PRATICA APERTA	ALPEADRIA	MOLO VII	D - DEFINITIVO
27/10/2017 17:20	SAMSKIP	41851	PRATICA APERTA	SAMER	RIVA TRIANA	D - DEFINITIVO
27/10/2017 17:30	SAMSKIP	63155	PRATICA APERTA	SAMER	RIVA TRIANA	D - DEFINITIVO
27/10/2017 18:00	FERRIERA	51191	PRATICA APERTA	SIDERURGICA TRIESTINA	BANCHINA EX ITALSIDER	D - DEFINITIVO
27/10/2017 18:58	(A) LUDWIGSHAFEN - OPEN	41855	PRATICA APERTA	E.M.T.	MOLO SESTO	D - DEFINITIVO
27/10/2017 19:00	LUBA	50597	PRATICA APERTA	KOMBIVERKEHR	MOLO SESTO	D - DEFINITIVO
27/10/2017 19:03	LUDWIG	141855	PRATICA APERTA	SAMER	RIVA TRIANA	D - DEFINITIVO
27/10/2017 21:00	(A) EKOL - OSTRAVA	43501	PRATICA APERTA	E.M.T.	MOLO SESTO	D - DEFINITIVO
27/10/2017 21:40	(A) EKOL - KÖLN	41857	PRATICA APERTA	E.M.T.	MOLO SESTO 8058	D - DEFINITIVO
27/10/2017 22:00	KARLSRUHE	45981	PRATICA APERTA	E.M.T.	MOLO SESTO	D - DEFINITIVO

# 3C.GATE AUTOMATION

**PORT**

**Port Community System**  
*Port Authority*

**GATE AUTOMATION**  
[HW – SW]



The screenshot shows a software interface for managing port operations. It includes a header with "Booking", "SysAdmin", "Gate", and "Kai". Below this is a form for "INTERCHANGE CONSEGNA" with fields for "Interchange", "del", "Contra", and "Transfero". There are sections for "AUTISTA" (with fields for Azienda, Partita IVA, Indirizzo, Comune, Provincia, Nazione, Papante, Cognome, Nome, Sesso, Badge, N. Attesa) and "MEZZO" (with fields for Targa Motori, Targa Rimorchi, and Pianale). A "NOTE" section is also present. A blue callout box labeled "AUTOMATIC DATA ACQUISITION" points to two images: a green container with a red box around its ID and a train car with a license plate "37 80 4956 089-9 TEN D-KOMBI Sdggnros". Below the form is a table with columns: ID, B.LIN, REF. CLIENTE, TIPO, MTS, PICO METRO, PICO LORDO, DOGANA, VOM, COMMITTENTE, DISTINTATO, TERM. PART., TERM. DIST. The table contains one row with a red box around the "MTS" value "MNU 707670".



**Port Railway gate infrastructure OCR / RFID**



# 3D. RAIL (GRAPHIC) MANAGEMENT & CONNECTORS

TERMINAL

TOS  
Port  
Terminal

RAIL (GRAPHIC) MANAGEMENT  
& CONNECTORS



The screenshot displays a software interface for rail management. At the top, there's a menu bar (File, Edit, Tools, About) and a search bar. On the right, it shows user information: 'User: admin Sede: Lugo Terminal'. Below this is a detailed summary for a voyage: '055382-16022017-190800 LUG-GIO-18 OUT treno arrivato'. It lists metrics like 'Total length: 490.01 m', 'Tot weight: 998.681 tons', and 'Tot goods gross: 506.481 tons'. The central part of the interface is a 3D graphic of a rail yard with several tracks. Each track is labeled with a number (1-5) and a weight (e.g., 3200 Kg, 32370 Kg). Below the graphic is a table with columns: 'lin...', 'Client', 'Load Unit', 'Gross Weight', 'Unit type', 'Cov...', 'Status', 'Full route', 'Prev...', 'F/E', 'Goods', and 'RID'. The table contains several rows of data, with some rows highlighted in pink. To the right of the table, there's a detailed view for a specific unit: 'Unit type: CASSA BOX MULTIFUNZIONE 30\"', listing various specifications like 'Tare mass: 3200.000 Kg', 'Capacity: 54.990 Kg', and 'Length: 9.125 m'. At the bottom, there are navigation buttons (1, 2, 3, 4, 5).

REAL TIME  
STATUS OF RAIL  
YARD

EASY PLANNING  
OF HANDLING  
OPERATION

DIGITALIZED  
FLOWS TO  
THIRD SYSTEMS

# RAIL LAST MILE MANAGEMENT – 4.OPTIMIZATION TOOLS

## OPTIMIZATION TOOLS



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# 4A. OPTIMIZATION SW MODULES

MAXIMIZATION OF THE NUMBER OF TRAINS TO/FROM THE PORT

RAIL SHUNTING OPTIMIZATION

RAIL LAST MILE OPTIMIZATION



RAIL TERMINAL OPTIMIZATION

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

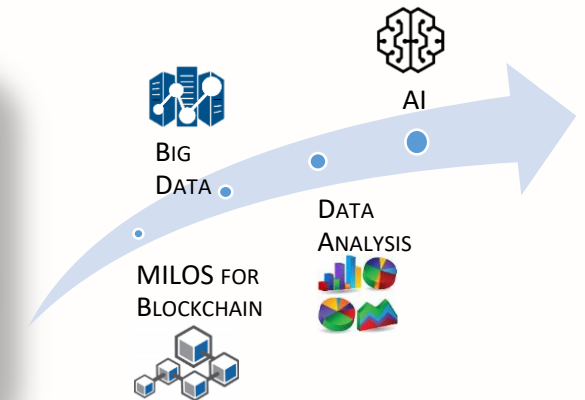
## Roadmap 2020



SCIENTIFIC  
RESEARCH  
ACTIVITIES IN  
PROGRESS



MILOS  
OPTIMIZATION



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

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Or

visit us @  
our stand  
11