



*Automation, Integration &  
Digitalisation along the supply  
chain: benefits of an innovative Terminal  
Operating System & concrete opportunities  
for International Fast & Secure Trade Lanes*

Valencia – Med Port

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Circle Group,

providing innovative technological solutions for the automation and digitalisation of the entire supply chain

delivering high value consultancy services supporting maritime, port and logistics actors to gather EU funding and promoting their strategic visibility at international level



*is the right international partner for your smart, sustainable and effective business growth*



1. Global supply chain visibility: digitalization & automation for an extended TOS
2. International Fast & Secure Trade Lane approach: integration with IoT
3. Circle Group: ongoing international projects
4. Important opportunities for Mediterranean Area

# 1

Global supply chain visibility:  
digitalization & automation for extended TOS

# 1. Global Supply Chain Visibility – What is it?

**Global Supply chain visibility** is the capacity to **track and trace** parts, components or products in transit from the manufacturer to their final destination. This includes logistics activities and transport as well as the state of events and milestones that take place before and during transit.

Global logistics leaders are using a variety of mechanisms, such as

- **Electronic Data Interchange** integration with ocean carriers
- **Web portals** for other service providers



*Improve*

Real-time visibility



Data timeliness

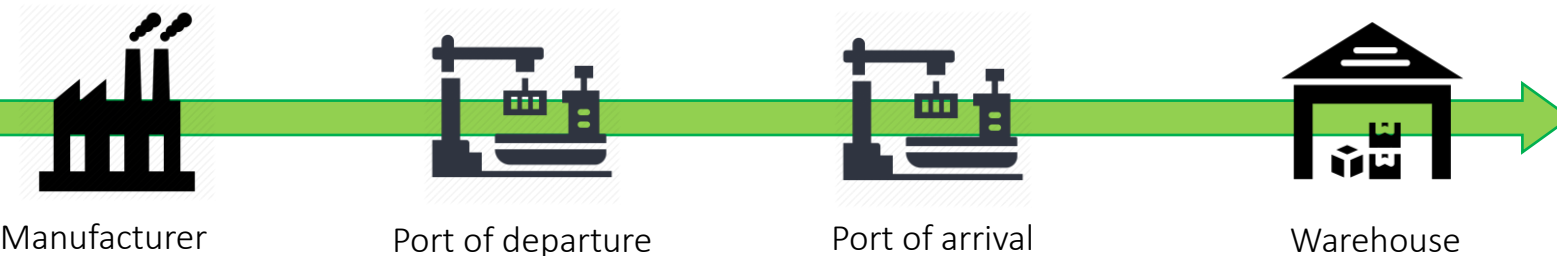


Accuracy



*Full visibility*

\*Example of supply chain



## 2. What are the problems and how we can solve them?

### Problems and Critical issue along the Supply Chain

- **Lack of dialogue** between the actors involved into the process;
- **Costs** related to the operative and customs activities;
- Duplication and sharing of information **not timely**;
- **Paper transport** documents;
- Using of **different standards**;
- **Long waiting times** and **reduction of efficiency** in the performance of activities;

Implementation of a  
**Digital platform**  
& the use of  
**IoT devices**



### Benefits and Added Value

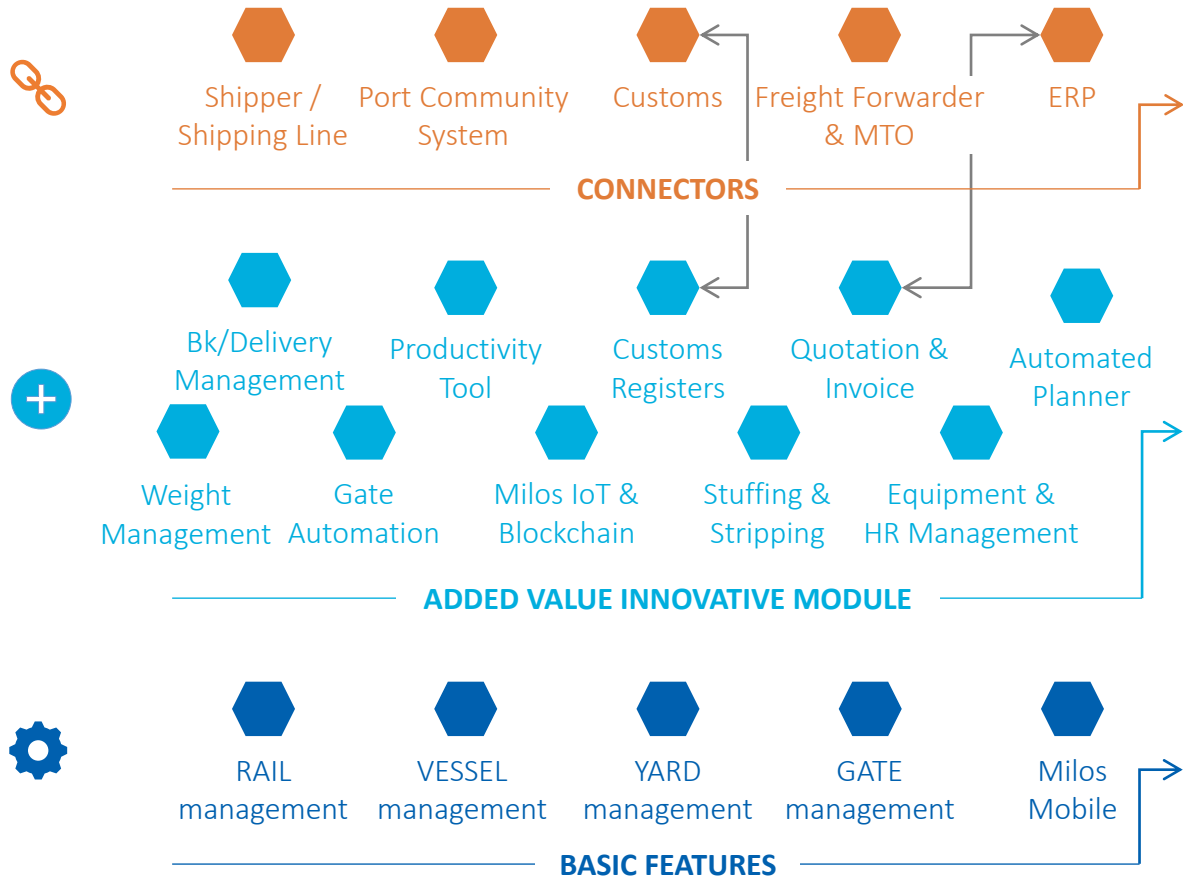
- **Complete vision** of the entire supply chain;
- **Transit and dwell time reduction**;
- Operative – customs - security **cost reduction**;
- **Reduction of costs** related to monitoring activities of the transport process and control of data and information;
- **Digitalisation** of the information and document flow;
- **Improvement** of the logistics process in terms of service quality and security level;

### 3. Digitalisation & Automation as solution: Extended Terminal Operating System + Value Added Services



A **Terminal Operating System (TOS)** is a key part of a supply chain and primarily aims to control the movement and storage of various types of cargo in and around a container or multipurpose terminal. It allows operators to **digitalize and automate** operative, administrative and customs procedures, also thanks to **IoT technologies** and **automation** solution natively integrated

# Milos TOS - Solution and interconnected systems



Specific connectors allows Milos TOS Suite to be integrated with the proprietary ERP systems and to dialogue with supply chain players' IT systems (e.g. PCS, Shippers, Freight Forwarders, Customs Agencies, etc.) through standard connectors (i.e. EDIFACT, EDIGES, etc.) in order to deliver value added services in terms of innovation, access to information, total digitalization.

In addition to TOS basic features, Milos offers a series of high added value modules that allow to **manage customs, administrative and commercial activities**, to automate and optimize gate and yard operations (**equipment and HR**) and to monitor terminal performance through productivity tools.

Milos TOS Suite allows to digitalize and automate the **main operations** (Rail, Vessel, Yard and Gate) of a multipurpose logistic terminal. The solution enables to manage different type of cargo handled (forest products, new cars, vehicles, trailers, project cargo and containers)



# 2

Our vision of International Fast &  
Secure Trade Lanes -  
applications and devices



The era of digitalization is revolutionizing the global supply chain system which concern the management of logistics and the lack of dialogue with the various internal terminals or logistics hubs. For this aspects has been designed the concept of **International Fast & Secure Trade Lane**, an End to End solutions able to share, manage anticipating the documents and information flow provided by the different stakeholders using evolved digital Corridor Management Platform.

This concept, which starts from a logic mainly addressed to the Shippers and Freight Forwarders, is extended to the entire logistics chain in order to create door-to-door chains (port to port) that involve all the actors.

The key words of IFSTL concept are:

- International: involvement of European and non-European countries;
- EU (and WCO) Innovative customs procedures presented also at international level and concerning the controls that derive for example from Maritime Single Window;
- Security: port, national and European regulatory security;
- Trade Lane: logistic and technical concept referring to real-time monitoring, GPS position, physical condition, integrity of the goods.

This concept is integrated with the use of the Internet of Things (IoT) as for example tags, security eSeals, customs eSeals, tracking tools that guarantee temperatures, integrity and monitoring of goods.

\*Circle Group's products and software solutions are compliant with the requirements of the European GDPR.



- Digitization of European documents flow
- Digitization of international documents flow through direct dialogue between countries, European – Not European Customs, Importer and Exporter

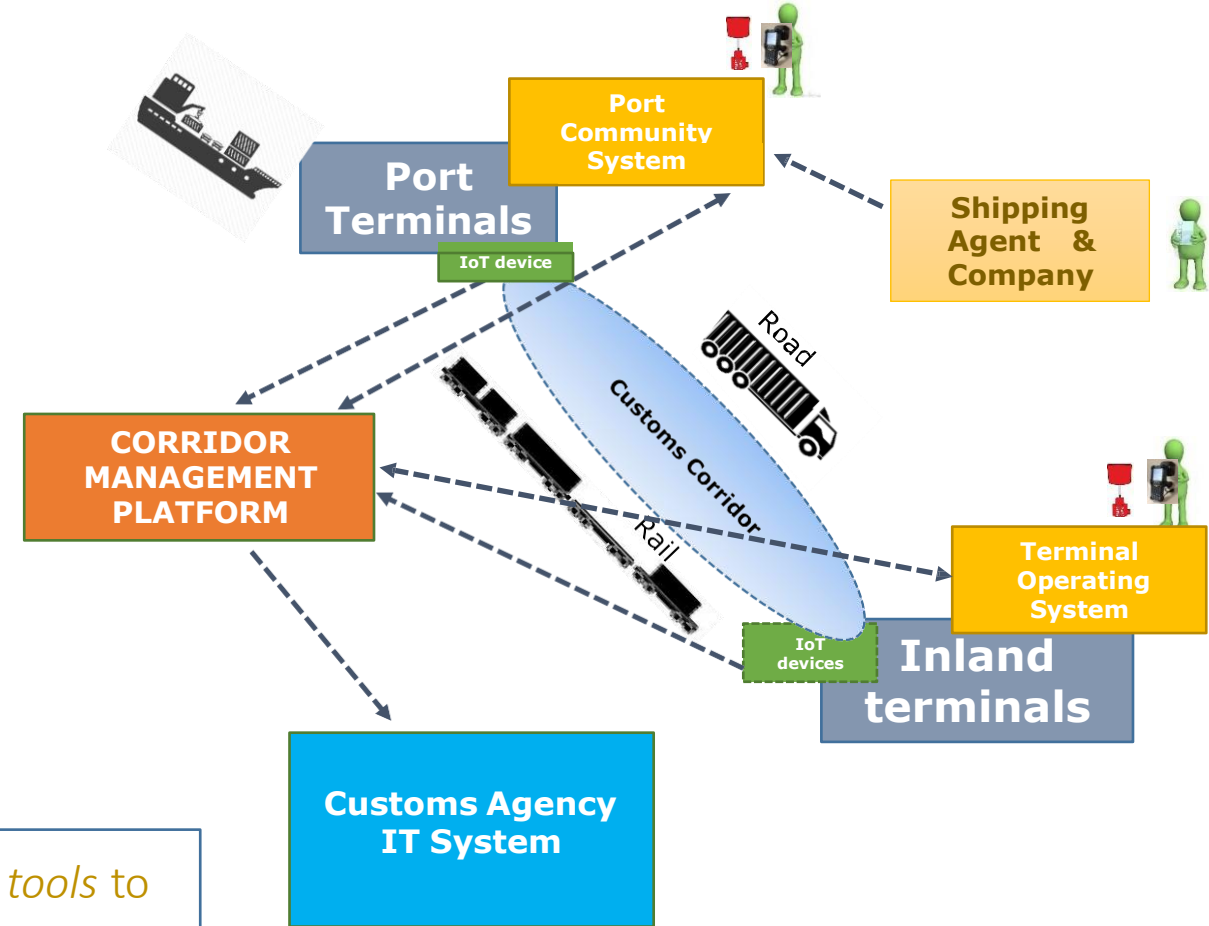
# The Digital connection among Ports and Inland Terminal

One of the main issues relate the logistics management is concerned the lack of dialogues with the different Inland Terminal or Logistics Hubs, this aspect represents one of bigger logistics diseconomies in terms of :

- *Transit-time;*
- *Costs linked to the permanence of goods inside the different storages area;*
- *Difficult to optimize the yard and storage area management;*
- *Urban impact caused by queues outside the port gates.*

## Digital Solutions:

- *Digital platform able to share data and documents anticipating the physical flow of goods;*
- *IoT devices able to catch the information, increase the security level and digitalize and automate the gate in and gate out operations.*



>> Cooperation of private and public actors represents an essential *tools* to the establishment innovative & simplified Corridor Procedures

1) Shipper/Stuffing area warehouse



Baptism in compliance with the most common passive RFID eSeals



Passive RFID eSeals for container

\* The Data collected by IoT device can be stored inside Blockchain Platform

2) Gate Terminal



Automatic Gate-in at the terminal thanks to RFID antennas



3) Port Terminal of departure

4) eManifest sent to Port of destination



Digital check of loading operation with handheld + eManifest data integration



5) Port Terminal of Destination

Digital check of discharging operation with handheld



Automatic Gate-out at the terminal thanks to RFID antennas



6) Final destination  
Proof of delivery





**Passive  
RFID tag**



**Passive  
RFID label**



**GPS/GSM+sensors  
Tracking systems**



**NFC+RFID + QR/barcode  
Tracking systems and  
asset tracking**

Passive RFID tag and RFID label are installed on trailers and cars respectively.

Through the Milos IoT app, these devices are associated with the license plate of the transport unit they are affixed to, with the purpose of uniquely identifying the goods transported.



**Active RFID  
seal**



**Passive  
RFID seal**

Passive RFID e-seals and active RFID e-seals are physically installed on the container ports. Through the Milos IoT app, these devices are associated with the code of the container they are affixed to, with the aim of uniquely identifying the goods transported. The e-seals also perform an anti-counterfeiting function, being able to record in the memory also the tampering event, thus providing indication, during the reading phase, on the state of the seal (effracted / not effracted).

## RFID readers used along IFSTL project and pilots



Wearable RFID reader  
with RFID antenna



Handheld with RFID reader  
and RFID antenna



Wearable RFID reader  
with RFID antenna

This slide shows three examples of manual RFID readers, two of which are wearable. The container data, trailers etc, stored on the chip of an RFID tag / e-seal are read through these devices and sent to a handheld device, which will take care of forwarding them to the system that processes them, automates operations and communicates to the managers of the terminal services the information needed to manage the movement of the goods.



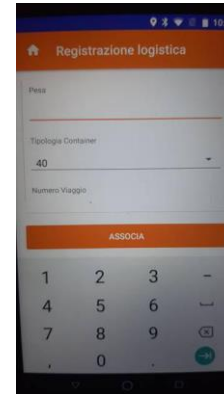
# Example of an automated port gate using RFID technology



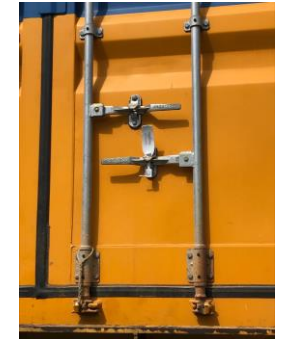
RFID infrastructure near a port gate. The yellow dots represent the fixed readers / antenna system. The rectangles in red represent the means that transport the containers. The green arrows indicate the gate-in lanes, while the blue arrow represents the gate-out lane.

Example of automated port entry using RFID technology. The system consists of two readers and two antennas per reader. When the container crosses the gate, the reader reads the tag / e-seal rfid

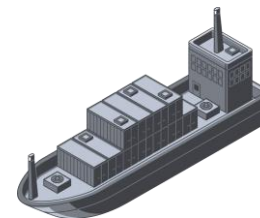
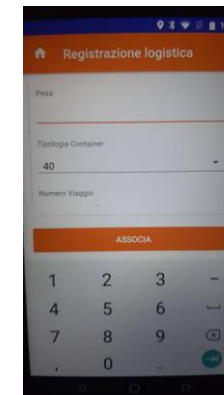
# International Fast and Secure Trade Lane (IFSTL) ongoing pilot



**Eseal on container**

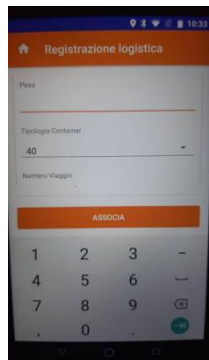


**Check by APP**



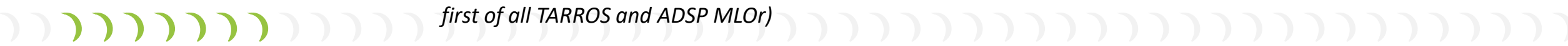
**IOT monitoring among supply chain**

**eSeal control ad destination**



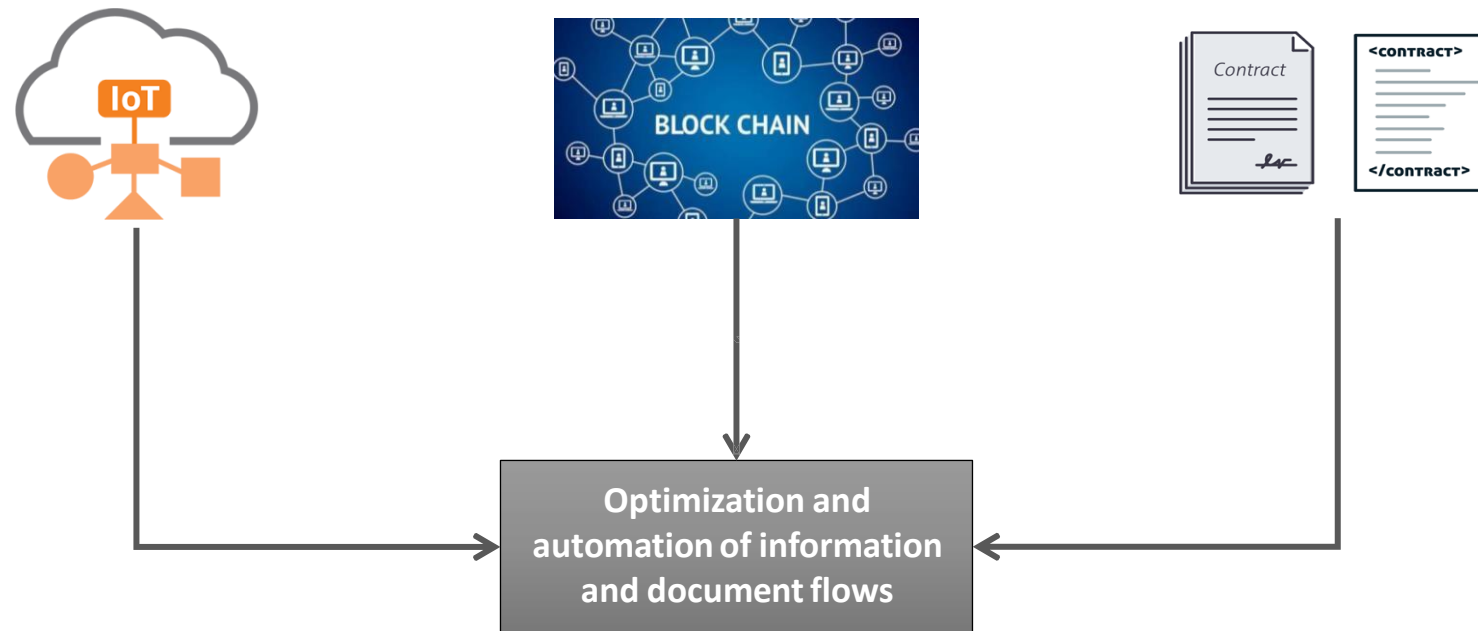
**Example of federative IFSTL**

*(FENIX – in cooperation with project partners and stakeholders, first of all TARROS and ADSP MLOR)*



# Integration of Blockchain, IoT, Smart Contract, BoL

The combined use of smart devices IoT and digital tools such as Blockchain Platforms and Smart Contracts has the purpose to dematerialize the transport procedures and relative contracts (BoL, Transport Document, Rail transport document, etc) leaving traces of all operations and events occurring within the Logistics Chain.



MILOS IOT & Blockchain connectors are solutions designed to integrate these innovative solutions

# 3

## Circle Pilot Projects – References Opportunities



### 3.Circle International Projects and corridors

A graphic showing a piece of brown cardboard with a jagged tear. The word 'References' is written in a black serif font on a white background that is visible through the tear.

## References

- **Fenix** with La Spezia Port and Trieste ports
- **I-RAIL** with Trieste, Genoa and La Spezia ports
- B2Mos Project with Leghorn Port
- E-Bridge with Ports of Genoa
- Cooperation ongoing and pilots with Catania and Taranto Ports

Thanks to the new joint venture with the Portugal company **Magellan**

- **“PIONEERS” project** - aimed at reducing GHG emissions in ports, increased automation and deployment of digital platforms.
- Support to **EU Commission in Portugal** for the provision of events management services of digital and innovative project

The International Fast and Secure Trade Lane project is based on the use of *tools, innovative technologies* (including the adoption advanced IoT devices (eSeals, RFID antennas)), *approaches and knowledge* that can also be applied to the Iberian market and its connections with the Mediterranean area.

**Main Goals:** the project has the purpose to create a *Corridor Management Platform and related FEDERATIVE SERVICES* with the aim to make easier the dialogue and the share of information among the different stakeholders involved. The use of *IoT devices and the digitalization* of the entire information flow has the result to allow *simplifications of operative and customs procedures*, decreasing the **overall transit-time** respecting the IMO standard of security and creating a *paperless international flow*, thus saving the relating costs.



## Operative and security

- Automated security check on seals integrity and container code recognition
- Reduced manual errors during seals check
- Reduced dwell time inside port areas and transit time along land routes

## Customs

- Anticipated customs information and docs
- Full digitalisation of Cargo and Customs Manifest from port of departure and direct exchange with arrival Port Platforms, exploiting the «once criteria»
- Exploitation of simplified EU Customs Procedures (EU Customs Code + Preclearing + Customs Corridor)

Within the next few months the ***IFSTL model and the adoption of IOT and other Federative Services*** are further used and tested in ongoing Mediterranean Sea projects and other EU pilot projects.

Upcoming opportunities for for ***Spanish and Portugal ports and logistic actors:***

1. **CEF2 FUNDING OPPORTUNITY - "PRIORITIES Series" #2** for the upgrade of port infrastructure, hinterland connections, developed dedicated terminals, increased ICT platforms and facilities;
2. **Next Generation Eu Vertical Items**

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Or

**You can find  
us at booth  
21**



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# *Thank you*

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