EVOLUTION TOWARDS PI

A REVIEW ON PILL-RELATED PLATFORMS AND STANDARDS

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Inhoudstafel

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Notes before reading

This document belongs to the series of reviews on PI business cases, which includes projects, platforms, standards and organisations. The documents in this series are living and subject to be updated as soon as an existing item is changed by its original author(s), or a new item is known to the best of our knowledge.

In this document, the existing PI-related platforms will be collected and reviewed. However, PI covers a wide range of technologies, for which the number of platforms to be reviewed could be too many to be useful. Therefore, we decided to confine our scope only to the PI-related platforms that have the potential to provide added knowledge to PILL. Please refer to the Alice Platform if you are interested in discovering a more complete list of PI-related Projects.

1   Existing platforms

1.1   Xrail (https://www.xrail.eu/intro)

Xrail is a production cooperation consisting of seven members, aiming to make European Single Wagonload a more competitive and more sustainable alternative to road transport. Xrails operations cover France, Belgium, Netherlands, Germany, Denmark, Norway, Sweden, Austria, Switzerland, Hungary and the northern part of Italy. Partners are CFL Cargo, DB, FRET (sncf), Green Cargo, Lineas, Rail Cargo Group (OBB) and SBB CFF FFS Cargo.

The Xrail members aim at executing international Wagonload transports according to a specific Estimated Time of Arrival (ETA), given at the time of booking and provide their customers with information before, during (Track & Trace) and after the transport. The Xrail Alliance strives for full interoperability between its members to enable a more seamless and swift European Wagonload offer for international Single Wagonload transports.

The mission of Xrail is:

- Xrail to act as a leading production cooperation, growing in network coverage and transport volumes, supporting the modal shift to rail

- The Alliance to improve reliability, information, performance and ease-of-use of European Single Wagonload, enabling a competitive customer offer and a sustainable business model

- Xrail to push standardization and harmonization of interfaces and procedures to enable full technical interoperability and seamless operations all across Europe

- The Alliance partners to commonly develop smart, technical solutions and IT platforms and support the automation and digitalization of the members to create additonal customer value and to strengthen intermodal competitiveness of rail

- The Xrail Alliance to bring together talented and agile people from members to boost innovation for the rail freight industry

- The members of the Alliance to team up for lobbying for a better framework for the European Single Wagonload

Partners:

- CFL Cargo   Luxembourg
- DB   Germany
- FRET (sncf)   France
- Green Cargo   Sweden

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- Lineas   Belgium
- Rail Cargo Group (OBB)   Austria
- SBB CFF FFS Cargo   Switzerland

1.2   Raildata (https://www.raildata.coop)

The main purpose of RailData is to develop, implement and run centralised IT Systems, designed to ensure data exchange between European freight Railway Undertakings, as well as with Wagon Keepers and other relevant companies.

Our mission is to support, promote and improve rail freight traffic in Europe through our digital platform, in order to enable our Railway Undertaking Users to provide best quality services to final rail transport customers. Use of shared central tools with standardized interfaces saves costs to our Users. Finally, improved competitiveness brings more goods on rails instead of road transport which contributes to saving of the environment, which is objective of the EU's Green Deal initiative.

Partners:

- CD Cargo   Czech Republic
- CFL Multimodal   Luxembourg
- DB   Germany
- Green Cargo   Sweden
- HZ Cargo   Croatia
- Lineas   Belgium
- Mercitalia Rail   Italy
- Rail Cargo Group   Austria
- Renfe   Spain
- SBB CFF FFS Cargo   Switzerland

- Slovenske zeleznice   Slovenia

- SNCF   France

- ZSSK Cargo   Slovakia

1.2.1   ISR

ISR aims for International Service Reliability. It is an information system developed and operated by RailData. It is a common tool of ISR railway undertakings for concentration and exchange information about movements of freight wagons in international traffic through a central platform. It makes possible to track both loaded and empty freight wagons and consignments across significant part of Europe. The main sources of the wagon status information are the systems of RUs, who register wagons in their trains and send wagon movement information to ISR. A subset of the consignment note data is taken over from ORFEUS to create Transport Description. In addition, ISR gets train movement information from the Train Information System of RailNetEurope.

Central data management (CDS) ensures reception of messages, their validation, conversion as well as storage. All data like the wagon movements, transport descriptions and train running are stored in the ISR and RTIS databases. ISR web centre allows for registered Users to search in the stored data and to display different views on them. Due to strict filtering rules, RUs can access the ISR and RTIS databases, depending on their role within the transport and relation to wagon. The relationship with the customers remains within each RU. ISR Users can also receive movement information reported by other ISR RUs, forwarded by the CDS in form of Wagon Status Messages.

These messages use modern XML syntax. Messages transmission is ensured with provided FTP client software, preferably over the Hermes VPN.

RailData's User Support Centre (USC) in Basel provides production support for ISR Users (RUs), as well as coordination between the individual suppliers for specific parts of the service. Information available is:

- o   Wagon status
- • ISR registers position and status of freight wagons. Railway Undertakings (RUs) involved in transport of the wagon or responsible for the wagon can see or get information where the wagon is and what is happening with it. Information is available on ISR web centre or is automatically sent to ISR Users with means of messages. Event information is stored for two months. Many different wagon event types are followed.
- o   Train running
- • Information about movements of freight trains is stored in RTIS database (Running Train Information System). It is used mainly for advanced wagon tracking based on the real time position of trains while running. RTIS also makes train run information available to RUs through web interface and also means of data messages.
- o   Wagon Performance
- • ISR collects wagon performance data (km) from some RUs and estimates distance done by wagons on behalf of other RUs using own calculation engine. Performance data are sent to interested Users and to the wagon keepers through the RSRD2 database (will be switched to the GCU Broker).
- o   Experienced plan
- • After a transport has finished, a part of the transport description as well as the first and last event is used to create an Experienced Transport Plan (ETP). For new transports running in the

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same relation and departing the same week day, ETPs can be used to estimate the arrival date & time (ETA).

1.2.2   ORFEUS

ORFEUS stands for Open Railway Freight EDI User System. It is an information system developed and operated by RailData. It ensures the exchange of railway CIM consignment notes and CUV wagon notes data between the co-operating railway undertakings (RU) using a Central Data management System (CDS).

ORFEUS has two main functions:

- CIM/CUV DATA
- Railway Undertakings send data content of the consignment/wagon notes to ORFEUS, which distributes these data to other carriers involved in the transport. The CIM/CUV notes in paper form exist and accompany the wagons still.
- ELECTRONIC NOTES
- Data Exchange is performed as above, but the data fulfil the role of the Electronic Consignment Note (ECN). There is no paper note issued nor transported anymore.

Railway Undertaking gets consignment information from the forwarding customer and completes the consignment note. Then it sends the consignment note from its Information System to ORFEUS.

ORFEUS receives and checks the messages for both formal and logical accuracy. Then ORFEUS forwards the consignment data to Information System of the next involved railway undertaking(s), depending on their role in the transport chain (and of course, only if they are connected to ORFEUS). Distribution is based on the carrier routing in the consignment note dataset.

There are more scenarios of message exchange flows, specific if the transport runs in a classic way, or using the Electronic Consignment Note (paperless transports). Current ORFUES message is capable to carry 100% of CIM consignment note data or CUV wagon note data and matches the requirements of the electronic consignment note defined by the CIT. There are more versions of the ORFEUS messages used in parallel. ORFEUS converts the different message versions. These messages use modern XML syntax. Messages transmission is ensured with provided FTP client software, preferably over the Hermes VPN.

Specific web based tool linked to ORFEUS allows on-line queries to search in the received and sent messages for analytic and support purposes. This tool is open to authorized staff of the Users only.

1.2.3   COREDA

COREDA stands for Commercial Responsibility Database. It is central database of freight wagons, where authorized companies can find who is wagon's keeper and mainly which railway undertaking is currently commercially responsible for the wagon. This is needed because each keeper can delegate rights for use of the wagon to another party. This database was designed by RailData on request and functional order from the UIC Wagon users Study group. This tool provides an important IT support for the European freight railway undertakings.

COREDA has 3 main functions

- WAGON DATABASE
- COREDA database includes list of wagon numbers with indications of its keeper (means of Vehicle Keeper Marking) and commercial/operational responsible RU. Because the situation of wagon changes

in time, there is also interval of validity and last modification date. Records are kept online for two years and the offline history is stored for 10 years. There are also functions for conflict management, access rights steering and for billing for database usage. COREDA also maintains needed reference data for validity checks.
- COMMUNICATIONS
- Users can upload their wagon changes (insert, update, delete) as data in form of csv of xml files over communication interface (web service or FTP/SFTP). Received data are validated and stored. In opposite direction, Users can get wagon data periodically or download on request when needed. Distribution options are specific for communication interface, and enable to get data for given wagons, changes from a date, daily changes up to general download.
- WEB CENTRE
- Web application enables authorised users to create, update or delete wagon records. Web also responds queries concerning current wagon situation or history of wagon keeper and commercial responsible. Users can alternatively upload files with wagon changes or request download data selected by various parameters. Of course user management and authentication is included too.

Each wagon participating railway undertaking maintains data about wagons for which they are commercially responsible. Updates are possible manually on the Web Centre, with manual uploads of change files or through communication interface. On the other hand, RUs use COREDA information for decisions regarding usage of wagons and their billing.

1.2.4 WDI

The aim of WDI (Web Data Interface) is to offer to RUs having low or small IT facilities a user-friendly web interface to operate electronic message exchange with RailData railway undertakings.

WDI functions are:

- TRAIN PRE-ADVICE
- WDI enables to capture data for the Train composition pre-advice message for the collaborating railway undertaking, which will take over the train. When completed, the tool sends out so called Hermes 30 message to the partner RU. In opposite direction, WDI can receive H30 messages from RU partners, who are going to hand over a train. It makes the data available for the WDI user.
- WAGON STATUS
- WDI also allows capture wagon status information (e.g. arrival, departure or delivered), which is then sent to the ISR application. This way, tracking of wagons is also possible at first/last mile operators.

WDI is web based tool with forms to capture train, wagon and consignment information, supported with reference data, logical checks and other features to ease the data input. Once all data is entered, the tool creates H30 message and sends it to selected RU partner. Partner RUs can also send H30 messages into the WDI and the WDI User can see the train data on the web, with option to print or download the data for internal use.

The data once captured or received for a train are stored and can be reused also for wagon monitoring. Wagon Status Messages can be initiated for all wagons in train set, as well as for single wagons. WDI also allows to capture wagon status information (e.g. arrival, departure or delivered), which is then sent to the ISR application. This way, tracking of wagons is also possible at first/last mile operators.

1.2.5   ATTI

It stands for "Agreement on freight Train Transfer Inspection". This agreement lays down rules for the transfer of interoperable freight trains and wagons between participating Railway Undertakings (RUs); these are based on the GCU (General Contract of Use for Wagons). In order to facilitate international freight transport, the participating RUs undertake to comply with the agreement.

ATTI is managed by the ATTI Study Group which is a UIC special group within the Freight Forum.

ATTI includes a single Quality Management System (QMS), where all quality indicators are documented in the ATTI Quality Database. This database, as well the ATTI-QMS web-application has been developed and is operated by RailData on request from ATTI Study Group.

- This tool provides IT support which is needed for:
- Planning of interoperable freight trains/wagons.
- Calculation of sample size of required technical inspections.
- Upload of inspection plans.
- Upload of inspection result reports.
- Consolidation and calculation of quality indicators.
- Documentation and reporting of irregularities.

Through the Quality Database, ATTI also provides a platform for quality indicators covering:

- Technical transfer inspections.
- Train and wagon data.
- Exceptional consignments.
- Dangerous goods.

Inspections are planned for each year, based on expected train/wagon volumes. Each ATTI RU enters at beginning of each year expected number of wagons on ongoing trains, spread over the respective RU destinations and transit RUs.

The QMS tool determines sample size for the RU which does the checking (how many wagons need be checked) and spreads the checks over the year. Based on the plan, RUs perform random inspections of trains/wagons. RUs upload or record the check results of the sampling tests carried out into the Quality Database until the end of the following month.

The tool brought the data obtained together and creates daily reports. The daily report always shows the current year. RUs can call-up the automated reports for their RU. These reports show overall assessment or evaluation by individual RUs. Except daily reports, also annual and year-end reports are available. Data (plans and inspection results) can be inserted or uploaded (as csv files) on the ATTI QMS web application or sent (as csv file) via FTP to the ATTI QMS.

1.2.6   GPS Wagon Localization

An internal study investigates the possibilities and different options in how to connect GPS wagon sensor data to the ISR Track & Trace system. A preliminary document is available for further discussion with Expert Groups

and membership management representatives. Many wagon keepers equip their wagons with GPS position reporting devises, but this information is not available to RU's, who transport these wagons. ISR could receive the GPS wagon data and use it for several purposes. With information from other sources, ISR can identify which RU is involved in current wagon run and make the GPS data available for this RU.

1.3 VisuRIS (powered by De Vlaamse Waterweg, hosted by NxtPort)

VisuRIS is a single window for inland navigation stakeholders and contains a wide array of services that visualize the transport and traffic-aspects on inland waterways. The goal is to improve efficiency as well as to enhance safety for the operators on board. So far VisuRIS only provides info on De Vlaamse Waterweg nv but the desired end-state is to expand further to national and European level.

The services provided by *VisuRIS* are based on the PIANC-guidelines (World Association for Waterborne Transport Infrastructure) through which the European Commission obliges its members states to harmonize the inland waterway services at European level. Based on the guidelines four core-technologies were defined that make up *VisuRIS*.

- Electronic Reporting International (ERI)
- Notices to Skippers (NtS)
- Inland Electronic Navigational Chart (iENC)
- Vessel Tracking and Tracing (VTT)

RIS streamlines the data exchanges between authorities and users of the waterways. For this reason, a uniform communication standard was developed to make electronic reporting possible (ERI). Once voyage, cargo and vessel related data is received by the (port) authorities this data is exchanged between the different authorities seamlessly without interaction of the skipper.

In addition, RIS has the goal to inform the users of the Belgian waterways as good as possible. VisuRIS makes use of real-time and planned data to inform the users about the status of the waterway network (NtS). Skippers e.g. will be informed of delays or obstacles and are able to calculate an alternate route to reach their destination immediately.

Traffic density is derived from the Inland AIS positions of vessels (VTT) navigating on the network, allowing to identify trends in rush hours and even waiting times. Owners or operators can also decide to share their position information with logistic partners so organization on the shore side can be optimized.

VisuRIS offers an easy access to all RIS information, optimising both efficiency, safety and sustainability.

- VAARWEGINFORMATIE

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Geografische, hydrologische en bestuurlijke informatie over de waterweg voor RIS-gebruikers om een reis te plannen, uit te voeren en te controleren.

- TACTISCHE VERKEERSINFORMATIE

Informatie die van invloed is op de directe navigatiebeslissingen van de schipper: een elektronische navigatiekaart (IENC) met de positie en identificatie van alle door een radar aan boord waargenomen doelen, maar ook informatie over onverwachte hinder in de nabijheid (2).

- STRATEGISCHE VERKEERSINFORMATIE

Informatie van belang voor middellange- en langetermijnbeslissingen van RIS-gebruikers bij de planning van een veilige en vlotte reis, optimale inzet van schepen, wachttijden en drukte aan sluizen, (on)verwachte hinder (3) , bedieningstijden (6) , enzovoort.

- CALAMITEITENBESTRIJDING

Activiteiten bij incidenten en calamiteiten: Informatie over de locatie en type van een incident (5) , contact met hulpdiensten (7) en berichten aan schepen (3) in de buurt (4).

- INLAND ECDIS

Weergave van elektronische navigatiekaarten en aanvullende informatie. Inland ECDIS draagt bij tot de veiligheid en de efficiëntie van de binnenvaart en daardoor ook tot het milieu. Inland ECDIS gecombineerd met informatie uit Inland AIS 2 biedt ook toegevoegde waarde binnen RIS.

- ELEKTRONISCH MELDEN EN GEGEVENSUITWISSELING

Via elektronische weg (9) kunt u uw reis- (15) en ladinggegevens melden om zo de administratieve afhandeling aan de sluis (10) en bij andere RIS-autoriteiten (14) tot een minimum te beperken. De kwaliteit van de eigen referentiegegevens wordt bovendien verhoogd d.m.v. een koppeling met de Europese referentiedatabanken (16).

- SCHEEPVAARTBERICHTEN (NTS)

Berichten van nationale en lokale (waterweg)beheerders over de status van de binnenvaartinfrastructuur (zoals bruggen en sluizen), tijdelijke blokkades (3) van de waterwegen, werkzaamheden, waterpeil en ijsvorming.

- INLAND AIS

Inland AIS (Automatic Identification System) (8) is een identificatiesysteem dat automatisch gegevens seint over naam, positie, snelheid en vaarrichting van een binnenschip. Dankzij AIS-stations aan wal (12) kan de infrastructuur beter worden benut, kunnen de verkeersposten efficiënter werken (10) en kunnen verladers en terminaloperators (15) hun logistieke planning verbeteren.

- INFORMATIE VOOR VERVOERSLOGISTIEK

Een overzicht van optimale routes (1) en aankomsttijden (11) voor verladers en planners.

- WETTELIJKE VERPLICHTINGEN

RIS-autoriteiten krijgen zicht op ontbrekende scheepsinformatie, bijvoorbeeld over gevaarlijke goederen of onbetaalde scheepvaartrechten. Hierdoor wordt het mogelijk om de schippers tijdig te informeren om zich alsnog in regel te stellen. Persoonsgevoelige informatie wordt bovendien met maximaal respect voor de privacy behandeld (13).

- STATISTIEKEN

RIS biedt veel cijfermateriaal om het overheidsbeleid te ondersteunen

The main components of RIS are:

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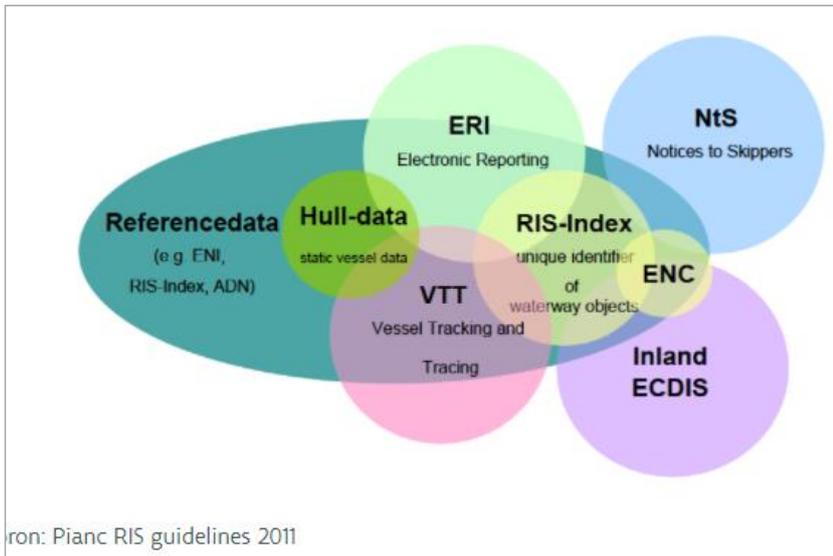
1.3.1   *Electronic Reporting (ERI): travel- and loading information*

Elektronische rapportage en elektronisch berichtenverkeer helpt een papierloze omgeving creëren in de binnenvaart. Alle nodige informatie is beschikbaar op het juiste moment en op de juiste plaats. De elektronische berichtenuitwisseling tussen de betrokken partijen zorgt voor een snelle verzending en transparante procedures met de nodige controles.

Scheepsinformatie en ladinggegevens zijn belangrijk voor alle schakels in de vervoersketen: overheden, sluiswachters, hulpdiensten, havenbedrijven, wagenparkbeheerders. Die gegevens kunnen worden verstuurd via elektronische meldsystemen volgens een vastgelegde standaard voor de binnenvaart. Zo worden de berichten, data items en codes van schepen voor de verschillende RIS-diensten gebruikt.

In Vlaanderen dient deze informatie ofwel elektronisch ofwel aan de eerste sluis op het traject aan de waterwegbeheerder overgemaakt te worden. Wanneer de melding elektronisch gebeurd dient de schipper zicht niet meer aan te melden op de eerste sluis. Op basis van deze melding zal de verplichte vaarvergunning opgesteld worden en de verschuldigde scheepvaartrechten worden berekend.

Om te kunnen melden kan er gebruikt gemaakt worden van BICS en dien je als meldunt "Vlaamse waterwegen" op te geven.

De ERINOT-berichten zijn een zeer belangrijke bron voor VisuRIS. Deze berichten bevatten immers belangrijke informatie voor het berekenen van de geschatte aankomsttijden (ETA) op bepaalde punten van het traject. Mits de juiste rechten door de eigenaar ingesteld zijn, kan je deze informatie voor bepaalde reizen ook opvragen in het systeem.

VisuRIS zal de binnenvaartbegeleiders op de kunstwerken op het netwerk van de Vlaamse Waterweg nv ondersteunen in hun taak. Met een klik kunnen zij alle belangrijke informatie over een bepaald schip en zijn lading opvragen mits deze reeds in het systeem aanwezig is. Wanneer een schip zich aan een kunstwerk meldt,

kunnen ze onmiddellijk nagaan of alle administratieve formaliteiten voldaan zijn zodat de schipper niet onnodig dezelfde informatie meermaals moet doorgeven.

1.3.2   Notice to Shippers (NtS)

(traffic information)

De internationale Standaard voor Berichten aan de Scheepvaart (verderop scheepvaartberichten genaamd) zal het gebruik van moderne informatietechnologie aan boord van binnenschepen en in het bijzonder de verspreiding van scheepvaartberichten door RIS (River Information Services) aanzienlijk bevorderen.

De verspreiding van scheepvaartberichten, ongeacht landsgrenzen en taalgebieden, draagt bij tot grotere economische efficiëntie en veiligheid in de binnenvaart. Een internationale standaard is noodzakelijk om een effectieve en veilige verspreiding van scheepvaartberichten door RIS te verzekeren.

In Vlaanderen worden deze berichten aangeboden via www.visuris.be/scheepvaartberichten. Via deze portaal kunnen de berichten opgevraagd worden van verschillende beheerders. Het is ook mogelijk om je hierop te abonneren zodat je de berichten per mail ontvangt.

1.3.3   Vessel Tracking and Tracing (VTT)

AIS (automatisch identificatiesysteem) is een RIS-technologie voor het automatisch delen van positie- en identificatiegegevens tussen schepen onderling en tussen schepen en walinstallaties. Met behulp van dit instrument kan de positie en bepaalde basisinformatie zoals naam, afmetingen en veiligheidsinformatie gevolgd worden om zo de efficiëntie en de veiligheid van het scheepvaartverkeer te verhogen.

Via het VHF-kanaal wordt de informatie uitgewisseld tussen de schepen en de walstations. Deze informatie wordt aan boord van het schip meestal gevisualiseerd op een ECDIS-viewer zodat de schipper op zijn kaart de schepen in de buurt kan volgen. Aan wal wordt deze informatie aangeboden aan de binnenvaartbegeleiders en de medewerkers van RIS- en VTS-centra.

De Vlaamse waterwegbeheerders beschikken over een volledige AIS-dekking van het waterwegennetwerk. De positiegegevens worden via VisuRIS verrijkt met andere informatie die ter beschikking is van dit vaartuig (vb: reis- en ladinggegevens). Via de verschillende platformen worden deze gegevens vervolgens ter beschikking gesteld van de medewerkers van de waterwegbeheerder en aan geregistreerd gebruikers van de toepassing, rekening houdende met de privacy-instellingen die de eigenaar van het schip beheert.

1.3.4   Inland ECDIS

Inland ECDIS is een systeem voor de elektronische weergave van binnenvaartkaarten en aanvullende informatie. Het wil bijdragen aan de veiligheid en de efficiëntie van de binnenvaart. Tegelijkertijd vermindert Inland ECDIS de werklast bij het navigeren ten opzichte van traditionele navigatie en informatiemethoden. Inland ECDIS biedt ook de basis voor andere River Information Services (RIS) aan boord van het schip.

Via de meeste viewers heeft de schipper de mogelijkheid om op zijn kaartdisplay bijkomende informatie te tonen zoals een radar overlay, AIS-informatie van schepen in zijn buurt en scheepvaartberichten (NtS).

De iENC-kaarten die gepubliceerd worden door de Vlaamse waterwegbeheerders kunnen via deze webportaal gedownload worden. Om op de hoogte gehouden te blijven van updates, dien je je te registreren alvorens deze kaarten te kunnen downloaden. Op bepaalde kaartenweergaven binnen de portaal kunnen de iENC-kaarten zelfs ook als achtergrondkaart ingesteld worden.

1.4 Arrival at Exit (C-Point, hosted by NxtPort)

Status: Operational (?)

A terminal operator has to notify the Belgian Customs about export containers / vehicles leaving the EU when arriving at the place of exit. As a terminal you can participate to this use case to deliver the necessary info to Customs for all containers that were declared through the eDesk/eBalie.

The 'Arrival at Exit Service' unburdens terminal operators to send each Arrival at Exit of an export container to Customs. With the 'Arrival at Exit Service' you get a ready to send Charge Report to Customs. Terminal operators only have to be connected to eDesk/eBalie and share their "gate in full" moves on the NxtPort-platform which is mapped to the requested Charge Report format.

As a terminal operator you always will be able to keep track if the Charge Report message is accepted/rejected by Customs Authorities.

1.5 Certified Pick Up (CPU, powered by C-Point, hosted by NxtPort)

Status: Operational, Phase II

Certified Pick up (CPu) is a neutral, central data platform providing the supply chain with a digital, secure and optimized cargo release and pick-up process in the Port of Antwerp. This is achieved by capturing and enriching container information - originating from different parties - on the Certified Pick up platform, in order to generate an encrypted digital key with which the final carrier can retrieve the container.

Using Certified Pick up, we can assure the right container is assigned to the right carrier. An audit trail is provided to make the entire process also auditable for the competent authorities.

While all parties involved in the container import flow will be prompted to give release information, only two parties are considered to be "data providers". These entities, being Ship Agents and Terminals, need to give their approval before a container can be picked up.
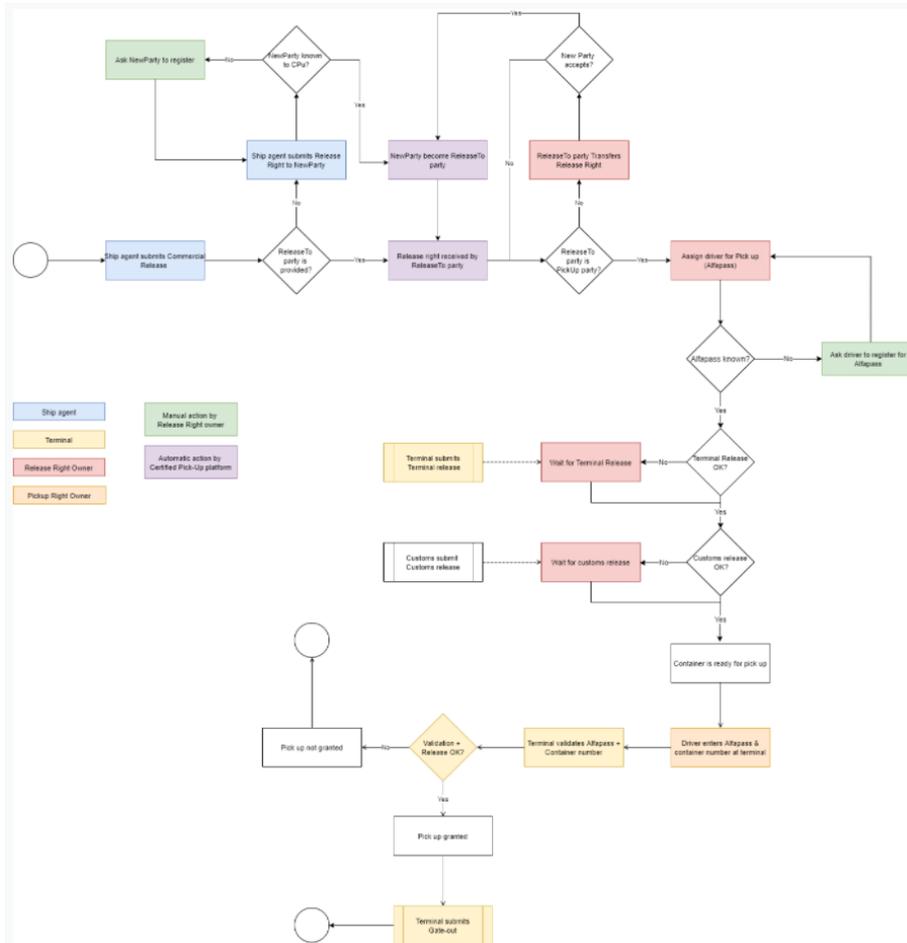
1.6 Export Manifest (powered by Port+, hosted by NxtPort)

Export Manifest is built together by NxtPort and Port+. Cargo data is collected automatically and in compliance with the customs regulations. The Export Manifest service automatically prepares a provisional Digital Export Manifest (IE547).

In the context of the Export Control System (ECS) Belgian customs obligates Shipping Agencies to deliver a Digital Export Manifest when a ship leaves the port. We combine various data sources to automate this service and to unburden the shipping agencies as much as possible.

As part of this service, Port+ foresees a C-point centric tool for shipping agencies to edit this information and send it to Customs. Customs Response is visualized in the same tool.

When a ship's agent sends in the report of which goods have left the port, the so-called export manifest, they require data from various sources: they need data from the COARRI/Discharge message and they need MRN data. After they have collected this data, they can start preparing the export manifest by combining the data. With NxtPort's Export Manifest API, these actions are no longer required, since the data is gathered automatically. Also, this data is re-used to create the export manifest and to send the manifest to customs automatically. This of course means significant savings in time and money.

As the providers of data, they remain the owners of the data and have the right to set fees for data usage. Useful data includes Terminal load confirmations (COARRI/Load-message) and Customs status of the goods (e-Desk). The data can be provided in a preferred way and harmonised by NxtPort. The Export Manifest will be generated automatically without the need for any IT integration.

1.7   Portcall + (powered by Port+, hosted by NxtPort)

NxtPort is teaming up with Port+ to offer precise and real-time information on the movement of vessels within the main Benelux ports.

Having a real-time overview of a vessel's voyages in the port is particularly useful for the planning of port operations. This is exactly what the PortCall+ API does. Developed by Port+ and available through the NxtPort marketplace, the PortCall+ API combines data from a number of sources into one complete dataset, to provide the status of all seagoing vessels that are expected or that are currently in the port of Antwerp, Zeebrugge, North Sea Port, Rotterdam and Amsterdam. Next to automated data processing from different systems, Port+ also enhances and corrects data hourly to provide extra information.

The PortCall+ API contains all available information about a vessel and its voyages within the port, such as:

- Port calls: previous port, next port, destination and origin port;
- Voyages (IN, SHIFT, OUT) with the responsible agent: entry, exit and berth locations plus the estimated and actual times;
- Predefined passages, such as Vlissingen, that can be used to implement custom expected / in-port logic;
- Anchor status;
- Stay information, such as stay number;
- Information about the vessel, such as IMO, callsign, tonnage,...

This API is a direct access API. This means that the data is not under specific sharing control, so it is accessible for anybody who subscribes to the API. If your application requires you to bring your own key to access the API, you can get that key by subscribing to this API.

Port+ owns the information returned by the API.

1.8   Qronoport (powered by Port+, hosted by NxtPort)

Qronoport is a collaborative data-sharing platform that makes the "pitstop" of a vessel in a port more efficient by combining data from various sources, including data directly from the stakeholders.

This innovative platform enables stakeholders in a port call (tank terminals, surveyors, ship agents, ship operators, cargo owners, …) to digitally share operational information with other stakeholders, thus providing visibility, predictability, and more efficient communication.

This is especially helpful (or dedicated) for liquid bulk vessels, whose operations involve the sampling and lab analysis of the cargos and much time waste during mooring (see this for more information).

The use cases

- For Cargo owners

  Cargo owners and charterers can avoid unnecessary demurrage and delays in their supply chains.

- For Ship operators

  Ship operators can use Qronoport to optimize voyages, vessel performance and adapt voyage planning.

- For Terminals

  Terminals can optimize their operational planning and further optimize berth and jetty occupancy.

- For Surveyors

  Surveyors can adapt their planning and operations based on correct and timely data, avoiding last-minute planning changes.

- For Ship agents

  Ship agents can optimize their activities by using Qronoport as a central single source of truth for their port calls.

- For Port authorities

  Port authorities can use Qronoport as a way to better predict the port activity and enhance general port efficiency.

- For Service provider

  Any service provider involved in a port call will have the latest port call data, and a tool to quickly adapt planning.

1.9   NxtPort Port Pilot Platforms

1.9.1   *Green Lights*

For an import container to be allowed to leave the terminal, there are several release messages (lights) that need to be provided:

- Release from Customs (CCRM)
- Commercial release from the shipping agent
- Vessel discharge confirmation by the terminal
- The container may not be blocked by the terminal itself

Hinterland operators arranging the pickup of the container from the terminal have a limited view of the status of these different lights. Transports are therefore mostly based on estimates, without the insurance that it is allowed to pick up the container. This means wasted transport, a delayed container, and in most cases a blind search for green lights.

With improved visibility on the status of the container's lights, forwarders and hinterland operators can better plan ahead and optimise their haulage processes. Container pick-ups can be dynamically switched in the planning and planning can be arranged tighter to the discharge moment, leading to shorter dwell times of the container on the terminal. This benefits the terminal and the final customer who receives his goods earlier and has more transparency.

The Green Lights API allows companies (forwarders, importers, transport operators or consignees) expecting import containers at the connected terminals to retrieve the actual status of each container, including details:

- Commercial release, provided by the shipping agent
- Customs release, provided by Customs (CCRM)
- Vessel Discharge, provided by the Terminal
- Other blocking factors, provided by the Terminal

Updates can be received via a Push notification after integration with the API, or can be consulted through the NxtPort NMoT console. And this service is currently only available for containers with known NMoT.

NxtPort integrates data delivered by data providers (terminal operators) into the followings:

- Commercial release, a format based on the COREOR message (without the PIN code)
- CCRM or Customs release, provided by the customs systems
- Vessel Discharge, provided by the terminal
- Blocked state (eg damages or terminal related problems), provided by the terminal

1.9.2   Next Mode of Transport (NMoT)

NMoT is an API for import container stacking in the yard. The data users and providers are the other way round to the Green Lights. By announcing the next mode of transport (NMoT) of full import containers to the terminal, stacking of these containers on the yard can be optimised in view of pick-up for hinterland transport. This can significantly shorten the turnaround time for trucks, barges, and trains at the terminal, as the containers are readily available (no more 'digging out') at the required location (trucking gate, waterside, rail side).

Next Mode of Transport offers a single API connection where parties can submit NMoT information for any connected terminal operator.

Accuracy

This NMoT data is informational and non-binding, yet supposed to reflect the actual planning of the parties involved in the taking out of the container. When the planning changes, an update of the NMoT data can be sent.

Timing

The usability deadline for submitting NMoT information depends on the terminal's capabilities and processes. NMoT data can be processed up to 24 to 8 hours before the start of the vessel discharge, depending on the terminal. Some terminals can dynamically change the planned location of a container even during operations.

1.10   Other Platforms Hosted by NxtPort

NxtPort combines information from multiple sources, and the data are shared/collected through a list of platforms in the marketplace. Major platforms with independent functions developed by other companies are listed independently in this file and marked "hosted by NxtPort", while the rest platforms are listed in this section.

1.10.1   Bulkchain

Status: Pilot

Participants:

- ArcelorMittal   Shipper
- Stukwerkers   Shipper
- Remant Transport architects   Maritime Logistics Service Provider
- Boeckmans   Shipping agent
- Haeger & Schmidt logisticsCargo handling – Inland navigation – Seaport forwarding
- Euroports   Maritime Suply Chain Solutions
- BIM (Belgo-Iberian Maritime)   Shipping Agent (breakbulk)
- Ipsen Logistics   Shipping Agent
- NOVA Natie   Warehousing and cargo handling
- FEDNAV   Shipping Agent (bulk)
- PSA Breakbulk   Terminal
- Neptumar   Shipping Agent
- FAST In Transport   (?)
- Katoen Natie   Terminal - Warehousing
- DKT Allseas   Shipping Agent
- Van Moer Logistics   Shipping Agent – Warehousing

Bulkchain is a collaborative platform built on NxtPort technology, dedicated to build the Breakbulk port of the Future. Originally founded in the heart of the Antwerp Breakbulk community, the platform allows participants to work together on the administrative processes to ship breakbulk cargo. By sharing data on shipments early in the supply chain, efficiency of the entire process increases, reducing time spent and administration efforts. In the end, all parties involved benefit from working together through the NxtPort platform.

Bulkchain consists of the following modules:

- Terminal Delivery
- The Terminal Delivery module can be used by forwarders to inform other stakeholders about incoming orders and (multimodal) transport visits. This allows for improved yard and resource planning. Terminal operators on their end confirm the shipments once they arrive at the gate and communicate differences on announced goods, weights and damages.
- Terminal Release
- A terminal release order is used by forwarders or transport companies to initiate a loading order at the terminal. They identify which goods need to be transported and define by which means of transport the goods will be picked up, and when. Once the transport arrives, the terminal confirms the release of the goods from their yard. This module includes relevant "Green Lights" that need to be available in order to release goods from the terminal.
- Vessel Discharge
- A Vessel Discharge Order is used by Shipping Agents to inform the other stakeholders in the supply chain about the different shipments on board of an incoming deep sea vessel. By digitising the manifest,

companies are able to plan better ahead and complete all necessary information before the goods arrive within the customs zone. Once the goods have been discharged, the terminal confirms the actual state of the goods towards the other stakeholders.

- *This module is primarily used for import related activities and is strongly connected to the Customs declaration processes.*
- Vessel Loading
- Similar to the Terminal Release, the Vessel Loading Order allows forwarders to initiate the release of goods from the Terminal. However, when goods are being sent with a deep sea vessel, the Shipping Agent takes the lead in the communication with the Terminal and the Shipping Line. They ensure that goods are loaded, including all necessary legal documentation. This module includes an electronic equivalent of the "Permis d'embarquement".
- Stuffing & stripping of containers
- Breakbulk goods that are stuffed into containers, leave the terminal with references based on their new packaging. For breakbulk forwarders (or manufacturers), information about their shipments needs to be transparent and independent of the state of the goods. The same goes for goods that arrive at the terminal packed into containers, yet need to leave as breakbulk cargo.
- Customs
- It's clear that customs plays an important role in the Bulkchain project. Working together closely with the authorities can shift the focus on administration towards added value and pro-active measures.

1.10.2 Import Consignment

The Import Consignment API returns the consignment data as it is received in the CUSCAR messages from the Shipping agent. These CUSCAR messages are sent into customs to declare the cargo discharged at a terminal.

You can re-use this cargo data digitally in your software and as such:

- avoid retyping
- reduce human errors
- use harmonised data formats
- avoid misinterpretations

All information is available digitally, based on unique identifiers of the cargo.

In order to retrieve the data from this NxtPort service, you need to provide a unique key (combination of BL number/Container number or BL number/Vessel stay), which identifies the cargo objects.

The needed information from the providers is the CUSCAR (customs cargo report) message through API, so that it saves time for the enquiries of CUSCAR messages. The API is access-controlled through OAuth2 authentication flow between the application user and the NxtPort platform and NxtPort keeps the track of the use history of data.

1.10.3 Port Directory (powered by Port+)

Port+ maintains a detailed list of contacts of companies that are active in the Belgian and Zeeland ports. An online portal allows people to look for a company based on the port where it is active, types of services, accessibilities... The NxtPort platform is offering an API that allows the same information to be consulted and integrated into applications.

The API provides general contact details of the company, activities, management info, contact details, opening hours... Listed companies are yearly invited to maintain the info by updating their details via a personal & secured URL. Every year, the content is published in the form of a book.

This API is a direct access API. This means that the data is not under specific sharing control, so it is accessible for anybody who subscribes to the API. If your application requires you to bring your own key to access the API, you can get that key by subscribing to this API.

Port+ owns the information returned by the API.

1.10.4   *PortStays (powered by C-point)*

APICS makes PortStays Open Data API available through the NxtPort platform.

The PortStays API contains a summary overview of all sea-going vessels that are expected to be in Antwerp, are sailing up, are in the port or have sailed for the past 24 hours. The API is made available through the NxtPort API marketplace. Companies that want to use the API are required to register with NxtPort. Use of the API is free but limited to 100 queries per day per company. This offers customers of the API the possibility to request an update every 15 minutes. Companies can get an update of all changes with 1 API call since a certain moment. This moment can be up to 6 hours earlier than the time of the API call.

This API is a direct access API. This means that the data is not under specific sharing control, so it is accessible for anybody who subscribes to the API. The PortStays API currently includes the active sea-going vessels of the Port of Antwerp only.

1.10.5   *Push Barges Location*

We developed in collaboration with the push barge owners, tracking providers & port authorities a solution to share the live location, direction and dimensions of every push barge in the port. This API is a direct access API and can be used in multiple use cases, here are a few examples:

- Push barges are sometimes left behind at a quay for a longer time period but in this case, it can be difficult for the authorities to contact the owner if necessary.
- When push barges are approaching a lock, the traffic controller has to make sure all the vessels fit in the lock.

Push barge owners use IoT devices to track GPS locations in real-time. These location data is also shared with the port authorities. NxtPort built an API to securely share the location data between the owners and the port authorities so that this information can be easily obtained from a single source.

The owner of the push barge can install an IoT device that frequently sends its location and the users are port authorities.

1.10.6   *Terminal Events*

Containers can enter/exit a terminal either through the gate (truck or train), or by vessel.

Terminal gate in and out moves of truck/train/barge (CODECO message information) and load/discharge moves of maritime-related operations (COARRI message information), are now available through the NxtPort platform to enrich the view on the supply chain.

Through the Terminal Events API, the latest terminal information of a container can be obtained. In addition, an alert will be sent when a new terminal event has taken place through the NxtPort notification system.

This service is based in the Port of Antwerp. The centralised API collects information from multiple sources and information is sent to a specified software or ERP. The data providers are the terminal operators.

1.10.7 Tresco Location (powered by Tresco)

The Tresco Location API is a direct access API, which translates latitude & longitude coordinates along European inland waterways to meaningful, human-readable locations. It is built together with NxtPort and Tresco.

Lat 51.297273 / Lon 4.268129 may not ring a bell, but Deurganckdok probably sounds more familiar.

The API is based on the inland waterways maps and covers all European waterways:

- All inland waterways in Belgium, Netherlands, Germany and France
- All inland waterways along the Danube up to the Black Sea
- The Po in Northern Italy
- Part of Poland

Tresco provides the needed data with its inland waterway charts and navigational tools. NxtPort is the exclusive access to this function.

1.10.8 UN/Locode

Since there was a need for an international and efficient convention to represent locations, the UN has put in place a code system. This code system is referred to as the United Nations LOCODE (UN/LOCODE) and is intended to cover ports, airports and other locations which are frequently used for goods movement associated with international trade.

The UN/LOCODE API allows to:

- Get location details based on a location code
- Search for locations based on simple search parameters
- Search for locations near a point on a map
- Etc

The list of codes is based on entries from governments and international organizations, or requests received from users. UN/LOCODE will continuously be maintained and are made available in the form of datasets on the UN website (that can be consulted or downloaded). Twice per year the list is updated and re-published.

Unfortunately, the lack of API's may prevent companies and organizations from using the UN standardized codes and opting for their own internal location codes instead. NxtPort is offering the UN/LOCODE data in a more user-friendly format and makes it accessible via API's so that applications can easily consult it.

The information is kept in accordance with the UN dataset and it is also possible to add new locations to NxtPort.

1.10.9 VGM: Method 1

Since July 1st 2016, every packed container to be loaded onboard a SOLAS (safety of life at sea) ship needs to have its Verified Gross Mass (VGM) determined. Determining the weight can be done through Method 1

(weighing the packed container using calibrated and certified weighing equipment) or through Method 2 (calculation: container tare weight + weight of the goods; which requires special permission).

The shipper provides this information to the shipping agent, who passes it on to the carrier (who needs to balance the vessel), and to the terminal (who is not allowed to load the container without the information). Several other parties could also benefit from having the weight in their digital files, e.g. CMR documents.

By using our VGM - Method 1 API, the last known verified weight and additional measurement information for these export containers can now be accessed through a central data source. This reduces the need for companies to share this data through the traditional means of communication (phone, email, pdf). The live version of the API allows you to look up the "Method 1" VGM of a container from the moment it is available.

The calculation of VGM needs multiple sources of data. For now, the API for Method 2 is still under development, but there is an available API to provide the tare weight of containers (in 1.10.10). This API is also access-controlled with OAuth2 authentication flow.

1.10.10   VGM: Tare Weight (powered by ContainerWeight)

The shipper provides the verified weight to the shipping agent, who passes it on to the carrier (who needs to balance the vessel), and to the terminal (who is not allowed to load the container without the information). Several other parties could also benefit from having the weight in their digital files, e.g. CMR documents.

By calling the VGM Tare Weight API with the correct container number both the tare weight and the container ISO code can be accessed. Our partner for this API claims 99% coverage of the current global container fleet. The API can be called by the container number as the request key. The information owner is ContainerWeight who maintains the completeness and accuracy of data, while NxtPort is responsible for integrating and contracting issues.

1.10.11   VisiGIP (powered by Port@pp)

When a container is selected by customs for inspection, the container's declarant receives a message from Customs to deliver the container for visual inspection at the Border Inspection Post (BIP). Within the VisiGIP application, the user is able to register the container, select a verified transport operator and create a request for transport from the Terminal to the BIP.

Once the transport operator accepts the mandate for the transport, he agrees upon delivery at the BIP within the hour (after leaving the terminal).

VisiGIP allows all related stakeholders to follow up on the status of the inspection. The following updates are available:

- Terminal-out status, when the driver leaves the terminal
- BIP-in status, when arriving at the BIP
- An alert if the window of 1 hour isn't met
- Scan in, the initiation of the scan process
- Scan out, the end of the process, after the image analysis

VisiGIP can be used as a separate app and is an extension to the CCRM "Green Light" from Customs. It is linked to our Green Lights API and the ImportChain data hub.

This application is built together by NxtPort and Port@pp. The target data users are forwarders, importers and transporters to enhance the visibility of the inspection process, and the providers are customs and customs and terminals.

1.11   Fiware (https://www.fiware.org/about-us/)

Mentioned in the bilateral interview with P&G

Fiware is a curated framework of open source platform components to accelerate the development of smart solutions.

Key aspects are:

- Open source: A market-ready open source software, combining components that enable the connection to IoT with Context Information Management and Big Data services in the Cloud.
- Smart usage of data: Standard APIs for data management and exchange, as well as harmonised data models.
- Smart solutions & services: Automation of processes across the entire value chain. Easy plug&play integration with other solutions and services. Part of a marketplace of portable and interoperable solutions.
- Fiware foundatotion: Actively promotes the FIWARE Adoption, supports the community providing shared resources and validates the FIWARE technologies.
- Fiware summits: A meeting place for developers, entrepreneurs, political decision makers, thought leaders, business executives and investors.
- Fiware ecosystem: More than 150 cities, 21 iHubs, a FIWARE Accelerator Programme, and strategic partnerships with GSMA, TM Forum, CEF, and ETSI, amongst others.

1.12   C-point (https://www.c-point.be/)

C-point is the platform for efficient digital communication between all players in and around the Port of Antwerp. C-point comprises the exchange of data between companies and authorities, between companies and between authorities and offers services regarding nautical functionalities, cargo and logistics, dangerous goods and customs. All types of freight and transport modes are supported. It supports and streamlines the day-to-day administrative and operational activities. Together with NxtPort - which offers data via the technical platform - C-point offers a complete package of applications to promote digital communication between all those present in and around the port of Antwerp.

C-point uses international standards to ensure the confidential transferability of digital information to increase transparency. Users are able to exchange messages with each other in a simple way via the central platform for electronic communication. All users are able to log in to the system with unique identification data. They are then able to send and receive messages via the system, to and from their trading partners and the various authorities. The message distribution centre keeps the low costs of the connection and maintenance. The C-point network supports both EDI and XML variants of the electronic standard messages together with other formats and structured or generated documents.

The target users are port authorities, customs, shippers, shipping companies, ship's agents, dispatching agents, terminal operators, road and rail transport companies, barge operators and logistics service providers.

1.13   RX/SeaPort (https://rxseaport.eu/en/)

Mentioned in the bilateral interview with POM WVL, MBZ

RX/SeaPort is the digital connection of all actors in the logistics chain in Zeebrugge. It allows creating a single connection to exchange data/information between all parties involved, such as logistic companies, terminals, shipping companies and besides this also public bodies like customs and port authorities.

In reaction to the effects of Brexit, they are providing services to make the Port of Zeebrugge BREXIT-proof and the final goal is that the physical traffic flow does not get interrupted because of the BREXIT-related document flow.

Their partners can be found on their website, in which familiar names are: Port of Zeebrugge, ECS, PSA Zeebrugge, POM West-Vlaanderen.

1.13.1   Pre-registration of customs data via the e-Desk

WHAT:

The e-Desk is available for all types of sea transport (deepsea, shortsea and ferry) and for different types of cargo (container, RORO, ferry).

- Import: via the e-Desk the user (freight forwarder, importer, …) informs the terminal operator of the customs status of the cargo with the accompanying customs document numbers (MRNs). The terminal operator can request this data permanently and is thus informed that a customs document is available for your goods. Based on this information, the cargo can be released for transport.
- Export: via the e-Desk the user (freight forwarder, exporter, haulier, …) informs the terminal operator of the arrival of a cargo with the accompanying customs document numbers (MRNs). The terminal operator can request this data permanently and is thus informed that a customs document is available for your goods. For those who have entered the data in the e-Desk, it is possible to request the status of his shipment (arrived at the terminal, shipped) via the web application.

FUNCTIONS:

- Pre-registration of customs data (import & export)
- Arrival report via e-Desk ("Arrival at exit")
- Export manifest via e-Desk
- Output confirmation in e-Desk

HOW:

The necessary data can be entered manually or via 'multi-insert' via the web application or automatically via a data connection with your company or via a connection with most customs software applications.

FOR WHOM:

- Terminal operators
- Customs declarants, freight forwarders and/or other logistics parties such as hauliers who have the customs document numbers

1.13.2 Track and trace via RX Dashboard

WHAT:

- Import: via the RX dashboard the importer, his representative and the haulier receive timely insight into the different statuses of their cargo, via a handy track & trace system.
- Export: via the RX dashboard the exporter, his representative and the haulier receive timely insight into the different statuses of their cargo, via a handy track & trace system.
- "Green lights" check

FOR WHOM:

everyone who is involved in the logistics process

1.14 Nallian (https://nallian.com/)

Mentioned in the bilateral interview with POM WVL

As supply chains are becoming increasingly complex and distributed, virtual integration of the actors in these fragmented networks is key to competing with fully integrated players and gaining competitive advantages. At Nallian, our mission is to improve the collective performance of distributed networks, empowering them to achieve levels of efficiency and visibility non could achieve alone. 'Making the world operate as one' is in our DNA, it's what we strive for every day. And because we're pragmatic, we do this one community at a time.

Leveraging a rich open ecosystem of collaborative apps underpinned by the world's leading data-sharing platform, Nallian for Air Cargo offers you the benefits of Cargo Community Systems combined with the power and agility of best of breed apps.

- Seamless data sharing across processes
- Use only the apps & functionality you need
- Short time to market
- Easy access to innovation, no vendor lock-in
- Solid integration with existing systems and processes

1.15 Transporeon (https://www.transporeon.com/en)

Mentioned by Tomas in the bilateral meeting with Sensolus

Transporeon owns and operates a cloud-based transportation sourcing and management platform to reduce the number of empty trucks, improve transparency, cut waiting times and enable efficient, digital end-to-end processes for the shippers, suppliers, retailers, goods recipients and carriers in the world. A variety of services are hosted in Transporeon, while the major sectors are as follows:

1.15.1 Market Intelligence and Benchmarking

Insights (Fact Sheet)

Transporeon Insights is a market intelligence solution that provides in-depth, real-time insights into markets, lanes, and their development over time. It provides in-depth, real-time insights into markets, lanes and their

development over time. Get insights into the European Transport Market (FTL) with the only solution that provides real €/km rates for contract and spot loads. This neutral market intelligence platform and API provides visibility on key direct (€/km) and indirect metrics across Europe. Transporeon Insights is powered by the richest dataset in Europe, derived from +100,000 transports per day on our platform. The primary features are:

- *Contract and Spot Rate*. Monitor the contractually agreed rates between shippers and logistic service providers and the spot market. With updates every 4 hours, Transporeon provides real-time information enabling the leverage of the volatility of the spot market.
- *Rejection Rate & Spot offers*. The price per km is the ultimate metric, no doubt. But tracking rejection rates and spot offers can also be used as leading indicators for spot pricing.
- *Auctionable data*. Transporeon makes complex data look simple while keeping it actionable. The biggest market changes and top movers are visualized so action can be taken immediately.
- *Diesel price*. Weekly updated diesel price per litre for all lanes shows developments over time and is readily comparable with other rates and indices.
- *EU Capacity Index*. This blended index is updated once a month and provides insights into truck availability development in Europe.

Supply Chain Advisory ([Fact Sheet](#))

Logistics has freed itself from its shadowy existence and today plays an important strategic role in companies. In times of globalization, complex supply chains, growing competition and increasing customer needs, it has become a demanding and very challenging task. Logistics managers have to adapt to the new challenges across all modes of transport in order to remain competitive and thus fit for the future. The Supply Chain Advisory experts have been supporting companies in supply chain optimization for more than 25 years. In addition to Transporeon´s Market Intelligence and the support in global strategic freight procurement, the global advisory for business logistics offers a comprehensive range of consulting services covering the entire supply chain.

The service range covers transport management optimisation, logistic network and flow design, specialised benchmarking (e.g., marketing, pricing) and warehouse optimisation and cooperative planning.

Market Intelligence ([Fact Sheet](#))

Ocean, air, road & rail, parcel & express: On the global transport markets, precise and up-to-date market intelligence is the key to smart procurement decisions and cost reduction. Achieving visibility of rates, costs, and service levels on a global scale, as well as exchanging best practices in strategic freight management will help to get a head start when competing for customers and supporting business units. Transporeon has been successfully running its cross-industry Transporeon Market Intelligence on a global and regional scale for many years.

The market intelligence initiatives use proven and dependable methods to accurately segment and harmonize market data for our analyses — only for shippers. Their members use these results for tactical freight purchasing and to hone their ongoing strategies and operational processes. Transporeon uses validated information derived from real negotiations and contracts in active use, examining data from companies in the same industries, of comparable size, and with the same strategic approach. The service can provide benchmarking data for ocean/road/rail/air cargo transportation for different areas, and customisation can be made.

1.15.2   Real-time Tracking and Visibility

Sixfold ([Fact Sheet](#))

Shippers are facing a growing number of customer demands, particularly for improved visibility and shipment tracking. The customers want real-time monitoring of deliveries and better order processing and tracking with

status updates. One of the greatest challenges to achieving this is the digitisation of the last mile of the supply chain. These are going to be tackled by this comprehensive visibility solution partnered with Sixfold. The core functions are:

- *Real-time GPS.* Live tracking and map display of vehicle and shipment geo positions for an end-to-end overview of status and progress
- *Automatic Status Messages.* Real-time status updates are displayed and transmitted by email and text, enabling proactive response and rapid conflict resolution
- *ETA Calculation.* Ongoing calculation of the estimated time of arrival (ETA), taking into account traffic, weather, driver breaks and more
- *Configurable Alerts.* Alerts and notifications about predicted delays can be sent to authorized parties by creating specific mailing lists
- *Delivery Confirmation.* Immediate notification of successful shipment delivery enhances shipper and carrier processes and improves customer satisfaction
- *Automated Data Collection.* Effortless, automatic collection and transmission of data from the telematics system or TMS replaces time-consuming manual processes and eliminates human error

How does it work?

- Carriers provide transport data by integrating their existing telematics systems Smaller operators may prefer to provide data via mobile devices. Option for carriers to provide data from their TMS
- Data is automatically shared between Transporeon and Sixfold
- Sixfold enriches carrier data with extra info e.g. traffic congestion, driver breaks

All authorized parties receive worldwide cloud access to the clearly structured Sixfold information. Shippers can send tracking links with just one click to selected contacts: goods recipients, carriers, colleagues. Mobile-optimized views mean that mobile device users do not need to install any apps.

Real Time Workflow ([Fact Sheet](#))

Real Time Workflow & Documents connects the truck driver's smartphone to the Transporeon platform and allows for continuous real-time processes, paperless delivery and transparency all the way to the recipient of the goods. It provides digital solutions for confirmation of receipt by signature on the smartphone screen and photographic documentation of cargo safety and transport damage. Real Time Workflow & Documents manages all transport documents digitally and makes them available on the truck driver's smartphone. With the automated status message, real-time GPS tracking, ETA calculation stated in 0, it has also the following features:

- *Electronic signature*. Signatures are entered via smartphone, and are then used to create delivery documents, are transmitted to selected recipients or imported directly into the customer ERP.
- *Photo Verification*. Photos of damaged goods, packaging material or to prove compliance with security regulations are transmitted directly via smartphone along with GPS position and are assigned to the transport.
- *Language*. The features are available in 16 languages.

e-CMR (sign-on-glass, [Fact Sheet](#))

The CMR consignment note, the International Convention on Contracts for the Carriage of Goods by Road, has been an indispensable contractual instrument in European road transport since 1956. However, for shippers, carriers and consignees, the CMR is still bound by an extensive procedure that makes it difficult for all parties involved in the transport to process the consignment note quickly and to react to the requirements and circumstances of their transport. The EU therefore supports the digitisation of the CMR to streamline processes.

Transporeon has developed an e-CMR (sign on glass) solution that advances this development and transmits digital consignment notes in real-time to the parties involved.

The e-CMR (sign on glass) is a solution that enables the usage of digital consignment notes when collaborating with other parties on the Transporeon Platform. This solution does not provide the technical authentication of the electronic consignment note by means of electronic signature as described in the eCMR protocol.

Shipper indicates that e-CMR can be issued. After the vehicle allocation, the unsigned e-CMR document is visible in the Transporeon app and available for further use. Shippers, drivers and goods recipients can conveniently sign the document on a mobile device (smartphone, tablet, etc). The e-CMR is generated in PDF format, updated in real-time with each status delivery, and can be viewed by the shipper (and carrier) at any time on the Transporeon platform. If required, an automated e-mail with the final e-CMR signed by all parties can be generated and sent to the recipient. The driver can enter necessary comments on the transport into the e-CMR, which are transmitted to the shipper (and carrier) accordingly.

Carbon Visibility (Fact Sheet)

Launching in early 2022, the new Carbon Visibility dashboard will enable Shippers, Carriers, and Freight Forwarders to precisely measure and report on their logistics emissions across the entire supply chain and all transport modalities and to provide tools to steer and reduce their future emissions.

HOW IT WORKS

MORE THAN JUST CO2 CALCULATION

1. MEASURE
- GLEC Certified
- Well-to-wheel & Tank-to-wheel
- Easy CSV/XLS upload or TMS API integration
- Flexible enrichment of RTV and FMS data

2. ANALYZE
- Integrated Performance Dashboards
- Historic market data on demand
- Benchmarking based on "apples to apples" comparison
- Specialized analysis on request

E2E CARBON VISIBILIY

4. COMMUNICATE
- Connect with like-minded leaders
- Exchange knowledge and best practices
- Exclusive online and offline events
- Joint research studies with scientific partners

3. REDUCE
- Data driven recommendations to decarbonize in line with the Paris Agreement
- Identify the best transport types, lanes, and partners
- Facilitate horizontal and vertical collaboration
- Base operational and strategic decisions on sustainable performance

1.15.3   Freight Procurement and Rate Management

Freight Procurement (Fact Sheet)

Transporeon Freight Procurement is an e-sourcing solution that brings speed and structure to the freight tendering processes. It simplifies the bid communications by keeping all the bidders up-to-date with the latest information by simple mouse clicks rather than queries. The supplier database has more than 45,000 carrier profiles and an extensive search function. The central communication channel enables one-to-one communication and group response. Template, copy function and Excel upload help with the quicker creation of RFQs, and fixed offer structure allow automatic offer validation. The bid will be processed in a transparent and secure bidding process and bid analysis will be conducted with combinatorial scenarios and extensive reports. Direct allocation via the platform or invitations to further negotiation will be then launched.

Freight Procurement Advisory & Analytics ([Fact Sheet](#))

Freight rate purchasing is both highly complex and highly specific, not to mention subject to continuous change. As a Purchasing Manager, it is sometimes hard to tell if the processes are optimized for the current market conditions and up-to-date with the latest developments. Highly complex market structures and ever-increasing demands for efficiency put pressure on Purchasing Departments. Transporeon has more than 20 years of experience in freight purchasing, profound market knowledge and an optimal tendering tool. It has the following features:

- *Intelligent Strategy for Freight Purchasing*: Consulting on purchasing strategy, professional tendering, tender evaluation and allocation decision
- *Efficient Data Check*: Preparation of data for the e-sourcing platform: Intelligent cleansing, harmonization and validation of data according to Tim Consult's Data-Check method
- *E*-sourcing platform: Service provider search within 40,000+ detailed and verified profiles, extensive search functions, transparent and secure bidding process, combinatorial scenarios and intelligent carrier communication and much more
- *Professional Reporting*: Scenario-, management- and extended reports as a basis for strategic decisions, development of procurement strategies, forecasts, negotiations with service providers and much more
- *Monitoring of Freight Rates*: Achieving visibility of rates, costs, and service levels on a global scale, as well as exchanging best practices in strategic freight management

Carrier Premium Account ([Fact Sheet](#))

With the Transporeon Carrier Premium Account, carriers have exclusive insight into calls for bids on Transporeon's cloud-based logistics platform. A premium freight carrier can increase visibility to shippers with additional opportunities to present services. Not only will premium carriers be invited to bid, but can independently find suitable calls for freight tenders, submit bids and gain new customers. Additionally, premium carriers have a number of exporting and reporting options that can make work much easier.

Trust Center ([Fact Sheet](#))

Transporeon Trust Center (TTC) promises to become the most complete Carrier profile overview in Europe. Integrated fully into the Transporeon platform, the TTC is a centralized platform to verify and manage your work with Carriers. Store documents, access data, and streamline compliance processes in one centralized location.

Powered by the Transporeon Platform, the Transporeon Trust Center enables participants to openly collaborate with partners while providing better visibility within Europe's largest logistics network. Profiles can be created with all the necessary documents, licenses, approvals, and certificates needed to operate as a trusted and compliant partner on the network. Shippers have the ability to invite all of their Carriers to join with just one click.

Rate Management ([Fact Sheet](#))

Transporeon Rate Management brings order to the freight rate structures, no matter how complex the data is or how many logistics contracts are being managed worldwide. One centralized rate management database facilitates easy access to information by storing all ocean, air and over-the-road freight rates and contracts—including historical data—in various currencies to quickly and easily process complex pricing plans, assessorial charges and surcharges, and alternative shipping options. Whether it is in sales, logistics or accounting, everyone accesses the same data.

Autonomous Procurement (no Fact Sheet available)

Transporeon Autonomous Procurement automates procurement using data and behavioural science to achieve requested capacity at lower freight rates for road transports.

It is analysed how the carriers make pricing decisions, in order to nudge them taking the transport at an individual rate which is fair for the carrier's situation. This is based on data science for carrier profiling, price predictions, and spot pricing tactics. Finally, this information is mixed in a fully automated process of predicting, framing offers, and concluding assignments to an entirely carrier-specific and automated process.

2   Existing projects

2.1   SENSE Accelerating the Path Towards the Physical Internet (Project Page and more info)

Project Description

SENSE is a 3-year project that started on 1 October 2017 and is currently completed. As stated in the name, this project aims at making the value of PI recognised by the logistic sector. This project is coordinated by ALICE (Alliance for Logistics Innovation through Collaboration in Europe), which is a European Technology Platform (ETP) supporting the research and innovation activities regarding logistics and supply chain management in Europe.

The time when SENSE was launched is 2 years after the expansion stage, when the PI concept design, quantitative experiments and case study had all been developed and produced to some extent. On the business side, as pointed out by ALICE, the emission problem from the logistic sector is gaining more attention, and new types of vehicles and technologies are bringing more possibilities. Whereas the logistic practitioners are struggling with reducing the emission while maintaining their competence at the same time. Therefore, PI is identified as a possible solution to this, and SENSE claimed its purpose is: "translating the Physical Internet academic vision into an industry roadmap in which shorter- and longer-term benefits in terms of productivity and efficiency can be realized". In other words, the main goal of SENSE is to focus on the idea of PI itself and promote PI to the logistic sector.

To build a consensus, one of the most important outcomes of SENSE is the roadmap to the Physical Internet (Figure 1), which summed up the development of PI in the future years from 5 aspects. Moreover, SENSE had also developed The Physical Internet knowledge platform (https://knowledgeplatform.etp-logistics.eu/) which gathers information on PI development.
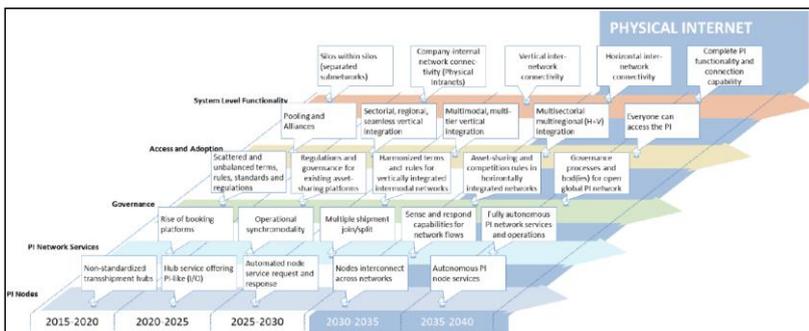

Figure 1. Roadmap to Alice

Partners

SENSE is coordinated by ALICE, and has the following listed partners (Belgian companies are in **bold**):

- **Procter & Gamble Services Company NV**
- FM Logistic Corporate
- Stichting TKI Logistiek
- Poste Italiane S.p.A.
- Interporto Bologna Spa
- **Vlaams Instituut voor de Logistiek VZW**
- Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V.
- Centro Nacional de Competencia en Logística Integral
- Instytut Logistyki i Magazynowania
- Technische Universiteit Delft
- Association pour la Recherche et le Développement des Méthodes et Processus Industriels
- Kühne Logistics University gGmbH
- Bluegreen Strategy s.r.l.
- Fit Consulting Srl
- Netzwerk Logistik

In which Procter & Gamble is the only common partner to PILL.

Relation to PILL

SENSE succeeded to bring PI into the consensus and the limelight. It paved the way for the PI projects afterwards.

2.2   MODULUSHCA: Modular Logistics Units in Shared Co-modal Networks (Project Page)

Project Description

The objective of Modulushca was to achieve the first genuine contribution to the development of interconnected logistics at the European level, in close coordination with North American partners and the international Physical Internet Initiative. The goal of the project was to enable operating with developed iso-modular logistics units of sizes adequate for real modal and co-modal flows of fast-moving consumer goods (FMCG), providing a basis for an interconnected logistics system for 2030.

Modulushca integrated five interrelated working fields: (1) developing a vision addressing the user needs for interconnected logistics in the FMCG domain, (2) the development of a set of exchangeable (ISO) modular logistics units providing a building block of smaller units, (3) establishing digital interconnectivity of the units, (4) development of an interconnected logistics operations platform leading to a significant reduction in costs and CO_2 emissions that will be (5) demonstrated in two implementation pilots for interconnected solutions.

Modulushca established a robust and replicable methodology to develop and evaluate solutions for interconnected logistics looking at other elements of the supply chain. Two implementation pilots were executed integrating key Modulushca developments in significantly different supply chains: (1) a closed pilot evaluating the benefits on an inter-site supply chain addressing handling and transportation of iso-modular logistics units within one company, and (2) an open network pilot will evaluate the impact of iso-modular logistics units in cross-docking and transhipment processes.

Modulushca efforts have led to the development of a road map towards a fully interconnected logistics system in 2030. The road map will address the changes and necessary steps to change the logistics system gradually, exploiting progress in digital, physical and operational interconnectivity, building on current players, assets and infrastructures.

Partners

MODULUSHCA was coordinated by PTV Planung Transport Verkehr AG. The other participating partners are (Belgian companies are in **bold**):

- **Procter & Gamble Eurocor N.V.**
- **Procter & Gamble Services Company N.V.**
- Association pour la Recherche et le Développement des Méthodes et Processus Industriels
- École polytechnique fédérale de Lausanne
- Université Laval
- Technische Universität Berlin
- Kirsen Global Security GmbH
- Poste Italiane S.p.A.
- CHEP UK LIMITED
- Inception Consulting Ltd.
- Instituto Tecnológico del Embalaje, Transporte y Logística
- Instytut Logistyki i Magazynowania
- J.A.M. de Rijk B.V.
- Meware Srl
- Technische Universität Graz

In which Procter & Gamble is the only common partner with PILL.

Relation to PILL

The time span of MODULUSHCA is from 2012 to 2016 when the concept of Physical Internet has not been popularised, and this project itself looks at the problem from the perspective of co-modal transportation. However, the idea to standardise the intelligent transport units coincides with one of the core ideas of standardisation in PI. The container sizes are carefully designed, with folding ability while still holding for stacking. However, PILL does not look at the contents in (or smaller than) 20'/40'containers at its early stage in order to focus on other logistics aspects and to remain simple.

2.3 ICONET: New ICT infrastructure and reference architecture to support Operations in future PI Logistics NETworks (Project Page)

Project Description

ICONET is a 30-month project that started on 1 September 2018. It is a living lab aiming at validating PI, with a particular focus on routing. Thus, ICONET greatly extends from SENSE and has more connections to real-life business cases. Following the principles of PI, ICONET aims to build a service-oriented model in the cloud that supports automatic routing, cargo splitting and bundling, especially for e-commerce by intelligentalise the cargos (packets) and collaborative decisions within the whole network. The scope covers short sea, railway, and road transportation under the framework of TEN-T (Trans-European Transport Network).
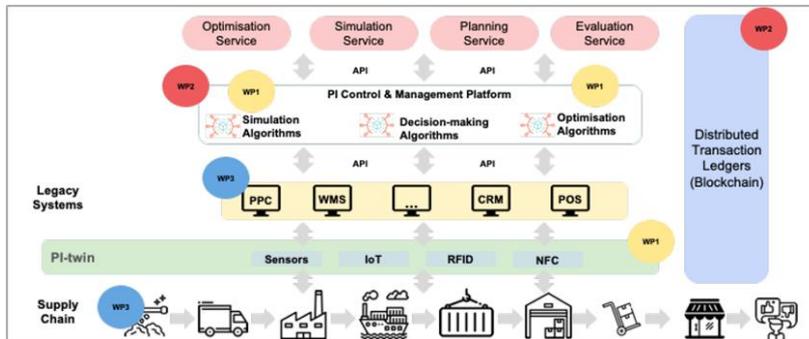
Figure 2. ICONET Initial reference Architecture

The initial reference architecture is shown in Figure 1. Although focused on routing, ICONET needs to create a number of enabling building blocks to make the model run, as PI is innovative in many aspects compared with the current logistic network. ICONET design its protocol stack layers with the reference to the OLI model proposed by (Montreuil et al., 2012), which is composed of Logistic Web, Encapsulation, Shipping (Order and Transport), Routing, Network, Link and Physical Layers. The Logistic Web layer manages the status of the PI entities in the network and contractual issues, functioning as the entry to the system; as cargo splitting and grouping is considered, the Encapsulation layer traces the original shipment and the allocated PI containers; Shipping layer maintains the shipment status and orchestrates information sources overall, in which Order layer monitors the order state and Transport layer tackles the data exchanges, and the Link layer is integrated into this layer; Routing layer calculates the best route for the PI containers; Network layer manages the interconnectivity and interoperability of the network; Physical layer synchronises the real-life operations and the PI digital twin. In line with the fact that GS1 standards have become the mainstream, ICONET shows the tendency to adopt GS1 standards for the information model standard in the Logistic Web, Encapsulation, Link and Routing layer (see here for more info). In addition, it is worth mentioning that blockchain technology is used. In the Shipment layer and Encapsulation layer, the smart contract is triggered for the shipments of containers and transactions between shippers and dynamic LSPs are managed.

To calculate both container routing and the encapsulation of the contents in containers, the D3 bin-packing algorithm is developed to fit the pallets into PI containers and attempts to use reinforcement learning methods are also made for a modified first-fit decreasing algorithm. Regarding the routing algorithm, they compared exact methods and multiple nearest neighbour (NN) algorithm-based heuristics. Deep-learning methods on a graph neural network are also developed, which is found to have better performance than the NN-based algorithm with increased running time. Moreover, because sending a PI mover to the right PI node takes time, an auxiliary machine learning forecasting model is developed to forecast the most likely cargo distribution in the network.

Partners

This project is coordinated by **INLECOM Group**, which is a Brussels-based organisation. The rest of the partner companies are (Belgian companies are in **bold**):

- ZORGIOS IOANNIS
- Consorzio Nazionale Interuniversitario per le Telecomunicazioni
- eBOS Technologies Ltd.
- Elupeg B.V

- **European Council Of Transport Users (European Shippers' Council)**
- IBM Ireland Ltd
- Electronic German Link GmbH
- **Union internationale des sociétés de transport combiné Rail-Route s.c.r.l**
- New Generation Sensors s.r.l.
- **Procter & Gamble Services Company NV**
- SONAE MC - SERVIÇOS PARTILHADOS, S.A.
- Stockbooking
- Instituto Tecnológico de Aragón
- **Havenbedrijf Antwerpen**
- **VLTN GCV**
- Procter And Gamble Operations Polska Spółka Z Ograniczoną Odpowiedzialnością

From the ICONET project website, additional partners can be found:

- CLMS UK Ltd.
- **Port of Antwerp**

Among the above, the common partners with PILL are: Procter & Gamble and Port of Antwerp.

Relation to PILL

ICONET is a successful case to pave the way to PI, which follows the original set of designs of Montreuil and integrate the recently available innovations to its best by combining the technologies such as blockchain and machine learning. However, it could be too futuristic to be largely implemented and present as a universal prototype. As for future efforts, major focuses can be the support in deploying PI solutions and investing innovative technologies, identification and justification of innovative technologies and mind-changing for stakeholders regarding data-sharing and collaboration.

2.4 CO3: Collaboration Concepts for Comodality (Project Page)

Project Description

Collaboration Concepts for Co-modality, CO3 is a business strategy enabling companies throughout the supply chain to set up and maintain initiatives to manage and optimise their logistics and transport operations by increasing load factors, reducing empty movements and stimulating co-modality, through Horizontal Collaboration between industry partners, thereby reducing transport externalities such as greenhouse gas emissions and costs. The CO^3 consortium, which is made up of logistics specialists, manufacturing industry and transport service providers, has been working on the topic of collaboration and co-modality for two years and already produced the first draft of a model framework with legal and operational guidelines for collaborative projects in the supply chain.

The 18 partners of the consortium in seven EU countries will coordinate studies and expert group exchanges over a period of three years, and build on existing methodologies to develop European legal and operational frameworks for freight flow bundling, (WP2).

The aim is to come up with joint business models for inter- and intra-supply chain collaboration (WP3) to deliver more efficient transport processes, increase load factors and the use of co-modal transport. The results of the studies and expert group exchanges will be applied and validated in the market via case studies (WP4).

Another aim is to set up at least four different real-life applications of collaboration across the supply chain by using road transport, multimodal transport, regional retail distribution and collaboration for warehousing activities. It will also promote and facilitate matchmaking and knowledge-sharing through CO³ conferences and practical workshops to transfer knowledge and increase the market acceptance of the CO³ results. This will be done through discussions with a High Level Board of European Industry supply chain Leaders, (WP5).

Partners

This project is coordinated by Nederland Distributieland Vereniging. The other participants are as follows (Belgian companies are in **bold**):

- **Procter & Gamble Eurocor NV**
- Argusi B.V.
- Kneppelhout & Korthals NV
- Stichting Dutch Institute for Advanced Logistics
- Heriot-Watt University
- **TRI-VIZOR NV**
- **Procter & Gamble Services Company NV**
- Cranfield University
- Fundación Zaragoza Logistics Center
- ELUPEG LIMITED
- Instituto Tecnológico del Embalaje, Transporte y Logística
- Procter & Gamble Italia SpA
- Technische Universiteit Eindhoven
- Lindholmen Science Park AKTIEBOLAG
- Association pour la Recherche et le Développement des Méthodes et Processus Industriels
- **Pastu Consult**
- Giventis International BV
- RINA Consulting S.p.A.

From the project website, they also have MINES ParisTech on board represented by Prof Eric Ballot. The common partners with PILL are: Procter & Gamble and TRI-VIZOR.

Relation to PILL

CO3 is proposed at the same period as MODULUSHCA. Thinking from co-modality, they have many things in common with Physical Internet, such as the stress on horizontal collaboration, bundling, fill rate and reduce of empty movements. Many case studies were carried out and innovative business models are devised in CO3.

2.5   FENIX: European Federated Network of Information eXchange in LogistiX (Link to Project Page)

Project Description

FENIX will develop the first European federated architecture for data sharing serving the European logistics community of shippers, logistics service providers, mobility infrastructure providers, cities, and authorities in order to offer interoperability between any individual existing and future platforms.

The idea of FENIX comes from the work and recommendations of the European Commission's Digital Transport and Logistic Forum (DTLF) to create a viable and valid federative network of platforms as enabler for Business to

Administration (B2A) and Business to Business (B2B) data exchange and sharing by transport and logistics operators.

FENIX main objectives are:

- establish a federated network of transport and logistics actors across Europe, enabling sharing of information and services needed to optimise TEN-T (A2&A3)
- demonstrate the operational feasibility and benefits through the organised national pilots –focus on testing the achieved interoperability capabilities (A4)
- set up the EU corridor community building programme and to promote the benefits to the participants in terms of reduced costs and GHG emissions (A5&A6)

Partners

There are in total 43 not clearly specified partners, but P&G, PoA and customs partake in this project together with:

- Barsan
- TCT Barge Terminal
- OIA Global
- Logit One

Relation to PILL

Case for P&G is very similar in both projects. The distinction to be defined.

2.6   DISpATch: Digital twIn for SynchromodAl Transport (Link to Project Page)

Project Description

This project stresses the dynamics and flexibility of synchromodal transportation and builds a digital twin for sophisticated transportation networks. The objective of this project is to develop such a platform in order to test dynamic planning algorithms and communication technologies which are also the main enablers for implementing synchromodal transport. The platform will operate like a digital twin that mimics the physical reality on a digital platform.

The project focuses on organizational and technical enablers for seamless synchromodal transport services in Flanders. Given the real-time dynamics and flexible nature of synchromodal transport, different transport modalities and actors need to work together and adapt according to unexpected events and contextual information that affect transport processes. These events and contextual information are related to negative as well as positive perturbations that shape freight movement and transport mode selection, such as new incoming orders, transport delays, cancellations, collaborative bundling opportunities, accidents, water levels, strikes and many more. Crucial elements in this regard are situational awareness of the current system state and projections of how the system will evolve once different actors take different actions. Individual company objectives at the micro level and network objectives at the macro level will be considered.

Partners

Partners:

- Vrije Universiteit Brussel (VUB), MOBI research centre – Scientific coordinator

- Universiteit Hasselt (UHasselt)
- Katholieke Universiteit Leuven (KU Leuven)
- VIL – Industry coordinator

Companies:

- Colruyt Group
- H.Essers
- Lineas
- NorthSeaPort
- Van Moer Logistics
- Ahlers
- Solvice
- Aurubis
- Move intermodal
- De Vlaamse Waterweg
- Shipit Multimodal Logistics
- Port of Zeebrugge
- NxtPort
- Port of Antwerp

In which the common companies involved in PILL are:

- Lineas
- De Vlaamse Waterweg
- Port of Zeebrugge
- NxtPort
- Port of Antwerp

Relation to PILL

There are a lot of commons between DISpATch and PILL. Both projects cover a wide range of companies in the logistic sector. Digital twins are going to be built in both projects to test what-if scenarios in a risk-free manner, and the emergence of unexpected events will be specially considered. Sustainability is a focus in both projects.

The differences are, PILL considers the problem from the perspective of PI, and more efforts will be put to build an information exchange system as a prototype for Physical Internet. Whereas DISpATch looks more from the synchromodal transport aspect and aims to build a GIS-based decision support system while stresses less on containerisation but more on the fill rate and inventory management.

2.7   FEDeRATED (Link to [Project Page](#))

Project Description

The FEDeRATED project is an EU Member States driven initiative to construct and validate the federative network of platforms approach as a means to enable data sharing in the logistics chain through providing interoperability between individual platforms.

This should allow new services to emerge. To this end, the focus is placed in the first instance on developing a framework for an interoperable data sharing environment and in the second instance providing a proof of

concept, also through the use of choice services and related data sets. The initially developed framework will be tested in pilots and living labs.

FEDeRATED facilitates constant interaction between the various Administrations and Businesses, also cross the border, and fosters a harmonised approach for data sharing:

- To reduce red tape for users in a secure, neutral and open way.
- To parse IT languages.
- To exchange data between platforms and IT systems.

Digitalisation provides a window of opportunities for seamless data flow management in logistics and smart mobility applications in transport. Both public and private sector parties can benefit.

However, major bottlenecks have prevented this from materializing. The basic bottlenecks are lack of interconnectivity - due to non-coherence of standards and silo use of standards per transport domain -, a fragmented legal base and a vulnerable level playing field. Big companies, including platforms, increasingly constitute a threat for SME's to access open-source data.

In order to develop a future proof federated concept of platforms, the FEDeRATED project will execute a both-feet-on-the ground approach that:

- Involves the builders.
- Makes use of what is already available.
- Support rationalisation, harmonisation and interoperability.
- Invites public and private parties to co-operate and execute tangible pilots and living labs.
- Connects all parties concerned, also those that normally do not co-operate.
- Creates a platform and knowledge base for all parties.

Partners

The partners are:

LUXEMBURG:

- 51Biz Luxembourg	Luxembourg
- Codognotto Italia S.p.A.	Italy
- Grimaldi Euromed	Italy
- Terminal San Giorgio	Italy
- Consorzio ZAILOG	Italy
- Traficom	Finland
- Vediafi	Finland
- Ahola	Finland
- Ministry of Infrastructure and Watermanagement (Netherlands). including 6 implementing bodies: Dutch Customs, Rijkswaterstaat, Rijksdienst Wegvervoer, Cargonaut, Portbase, and Connekt	
- Ministry for Transport, Mobility & Urban Agenda	Spain
- Puertos del Estado	Spain
- Administrador de Infraestructuras Ferroviarias (ADIF)	Spain
- Swedish Transport Administration	Sweden
- Swedish Maritime Administration	Sweden
- IATA	EU wide

The project is open to observer organisations that would like to contribute and join efforts to realize sustainable data sharing. The German Ministry of Transport and Digital infrastructure participates as an observer in the FEDeRATED projects.

Within the context of testing data sharing opportunities on their feasibility business and public authorities are invited to participate in a multitude of national and cross-bordering pilots and living labs.

Relation to PILL

Both projects are focussing on the optimisation of information sharing among logistics actors. FEDeRATED starts from a focus on B2A communications, but also includes B2B communication in a later stage.

FEDeRATED also includes 21 living labs with different focuses, from a specific commodity along a specific corridor to a general monitoring system of all cargo (by governments).

The main difference is that FEDeRATED focuses solely on information sharing, without linking it to a physical internet way of thinking.

2.8   Digital Gateway 2 Government (Link to [Project Page](#))

Project Description

The project Digital Gateway 2 Government has designed IT systems that contribute to more fluent digital communication between companies in the gateways involved in import and export processes, and the relevant government services on the other hand.

For the handling of goods in the airports and seaports in Flanders, communication between companies and government services, like customs, the Federal Agency for the Safety of the Food Chain (FASFC) and the Federal Agency for Nuclear Control (FANC), is very important.

The current processes often delay the handling of goods and have a high error rate. This affects the competitiveness of the Flemish gateways. A smooth and cost-efficient flow of goods is of crucial importance for their international customer service.

At this time, communication with government services is unstructured and quite inefficient. IT systems are not available in most cases. The ones that are available need properly functioning emergency procedures that prevent delays in cases of technical problems or maintenance.

RESULTS

Within the project VIL developed four use cases:

- A Digital Emergency Procedure System
- A Verification Management System
- Automated Write-off licenses for strategic goods
- Automated food FANC reporting

One of the most important use cases is the Digital Emergency Procedure System. This IT system allows companies to continue their activities almost unhindered, during emergency customs procedures. This is a big improvement compared to the current situation in which paper procedures are the only solution.

Partners

This project has the following listed partners (Belgian companies are in **bold**):

- **Atlas Copco Airpower**
- **Aviapartner**
- BASF
- **Brussels Airlines**
- **Brussels Airport Company**
- **Crossroad Communications**
- Evonik
- Hapag Lloyd
- **Intris**
- **Liège Airport**
- **Luchthaven Oostende**
- **MBZ**
- **Neutraal Douaneagentschap Nelen**
- **North Sea Port**
- **NxtPort**
- **Port of Antwerp**
- **Swissport Cargo Services Belgium**
- WFS

The common partners with PILL are:

- MBZ
- NxtPort
- Port of Antwerp

Relation to PILL

Both Digital Gateway 2 Government and PILL focus on the information exchange of import and export-related activities. However, what Digital Gateway 2 Government endeavours to improve are the procedures and communication systems between companies and government, and the targeted problems are delay and error rate.

2.9 ePIcenter: Enhanced Physical Internet-Compatible Earth-frieNdly freight Transportation answer (Link to Project Page)

Project Description

The seamless transport of goods is a top priority of the trade and logistics sector. Focussing on the technological and operational opportunities that the physical internet, synchromodal operations and other disruptive technologies provide, the EU-funded ePIcenter project will develop new solutions aimed at increasing the efficiency and sustainability of global supply chains. This will enable all players in global trade and international authorities to cooperate with ports, logistics companies and shippers and to respond to volatile political and market changes. Headed by a consortium of 35 partners representing leading ports, forwarders, cargo owners, logistics providers, knowledge institutions and technology firms, the overall aim of the project is to create a sustainable logistics chain of the future.

Objective

ePIcenter will create an interoperable cloud-based ecosystem of user-friendly extensible Artificial Intelligence-based logistics software solutions and supporting methodologies that will enable all players in global trade and international authorities to co-operate with ports, logistics companies and shippers, and to react in an agile way to volatile political and market changes and to major climate shifts impacting traditional freight routes.

This will address the ever-increasing expectations of 21st-century consumers for cheaper and more readily available goods and bring in Innovations in transport, such as hyperloop, autonomous/robotic systems (e.g. "T-pods") and new last-mile solutions as well as technology initiatives such as blockchain, increased digitalisation, single windows, EGNOS positional precision and the Copernicus Earth Observation Programme.

ePIcenter thus addresses MG-2-9-2019 of H2020 Mobility for Growth "InCo Flagship on Integrated multimodal, low-emission freight transport systems and logistics", particularly in what refers to new logistics concepts, new disruptive technologies, new trade routes (including arctic routes and new Silk routes) and multimodal transfer zones. ePIcenter will speed up the path to a Physical Internet and will benefit peripheral regions and landlocked developing countries.

ePIcenter will reduce fuel usage (and corresponding emissions) by 10-25%, leading to greater utilisation of greener modes of transport reducing long-distance movements by trucks by 20-25% and ensuring a smoother profile of arrivals at ports which will reduce congestion and waiting/turnaround times.

Partners

This project is coordinated by **Havenbedrijf Antwerpen**, an Antwerp-based company. The other partners are (Belgian companies are in **bold**):

- DHL Management (Switzerland) Ltd
- Panasonic Business Support Europe GmbH
- Continental Däck Sverige AB
- Stena Rederi AB
- Autoridad Portuaria De La Bahia De Algeciras Mopt
- Total Terminal International Algeciras SA
- to-be-now-logistics-research-gmbh
- Logistik-Initiative Hamburg Management GmbH
- Duisburger Hafen Aktiengesellschaft
- **Anheuser-Busch InBev**
- Aker Arctic Technology Oy
- MJC2 Limited
- GVZ Entwicklungsgesellschaft Wolfsburg mbH
- Einride AB
- TIS.pt – Consultores em Transportes Inovação e Sistemas, S.A.
- Effective Seaborne Engineering Solutions S.L.
- Vilniaus Gedimino technikos universitetas
- Akciju Sabiedriba Transporta Un Sakaru Instituts
- Uniwersytet Morski w Gdyni
- **NxtPort**
- Heriot-Watt University
- BALance Technology Consulting GmbH
- BIBA - Bremer Institut für Produktion und Logistik GmbH

- Hochschule Emden/Leer
- Den Hartogh Holding BV
- **Logit One NV**
- Universidad de La Sabana
- Polskie Koleje Państwowe Spółka akcyjna
- Uprava pomorske sigurnosti i upravljanja lukama
- Shandong University
- Université Laval
- Beijing Trans Eurasia International Logistics Co.,Ltd
- AstaZero AB

In the above list, the common partner with PILL is: NxtPort.

Relation to PILL

Both PILL and ePIcenter notice the communicating problem among logistic practitioners which are centred around ports and think from the standpoint of Physical Internet. Different from PILL, it is clearly stated that cutting-edge technologies will be used in ePIcenter such as AI and blockchain, and the ePIcenter covers a larger range, but PILL addresses building a prototype for more universal references and applications.

2.10 STARGATE: SusTainable AiRports, the Green heArT of Europe (Link to Project Page)

Project Description

STARGATE is the response of a consortium of 22 entities led by Brussels Airport committing to create green airports as multimodal hubs for sustainable and smart mobility. STARGATE follows an ambitious strategy to impactfully contribute to the strengthening of the competitiveness of the European air transport ecosystem. The mission of the STARGATE consortium is to develop, test and deploy a set of innovative solutions making the airport ecosystem significantly more sustainable. Our vision is to build with STARGATE a benchmark and be source of inspiration to other airports in Europe and the world.

STARGATE is grounded on five main pillars.

- The first one is the application of a Digital Twin ecosystem for airports and extensive development to model the Lighthouse Airport, its transport flows, airport process, energy production and supply and emissions management.
- The second pillar is the focus on multimodal, sustainable and smart mobility through an innovative mobility governance practice to create an intermodal hub, and dedicated tools to enhance digitalisation and decarbonisation of transport for both people and goods.
- Third, the optimisation of terminal operations, including the deployment of a Terminal Command Centre, a novel approach to circular resource management and the minimisation of resources and waste generated.
- The fourth pillar tackles the investigation in the energy field and production and use of SAF.
- Finally, the fifth pillar covers cross-cutting aspects such as minimisation of noise and emissions, assessing non-technological framework conditions and promoting new multi-actor governance arrangements. In STARGATE all actions undertaken are widespread as much as possible, not only to create awareness, but also to serve as valuable inputs and groundwork for other initiatives and projects in the sustainability field. Ultimately, this value chain will improve the quality of life of European citizens and provide solid foundations for a sustainable future.

Partners

This project is coordinated by Brussels Airport Company. The other partners are (Belgian companies are in **bold**):

- To70 B.V.
- Athens International Airport S.A.
- Budapest Airport Budapest Liszt Ferenc Nemzetközi Repülőtér Üzemeltető Zártkörűen Működő Részvénytársaság
- Aéroport Toulouse-Blagnac S.A.
- LuxMobility S.A.R.L
- **Universiteit Hasselt**
- Erasmus Centre for Urban, Port and Transport Economics BV
- IES R&D
- Sopra Steria Group
- **Air Cargo Belgium**
- **DHL Aviation**
- **Vlaams-Brabant**
- **Belgisch Laboratorium Van De Elektriciteitsindustrie Laborelec Cvba**
- **Skytanking**
- **Quatra**
- **Vlaamse Instelling voor Technologisch Onderzoek N.V.**
- **TUI Airlines Belgium NV**
- **Brussels Airlines**
- **Societe Nationale des Chemins de Fer Belges**
- **Vlaams Instituut voor de Logistiek, VZW**
- **Skeyes**

The common partners with PILL are: Air Cargo Belgium and Vlaams Instituut voor de Logistiek, VZW.

Relation to PILL

STARGATE aims to improve the airport ecosystem for both cargo and passenger transportation, which could be more about the intra-airport. Both STARGATE and PILL focus on the sustainable target by building a digital twin for multimodal transportation. Whereas STARGATE, according to its introduction, is mainly about procedural optimising of air transport, but to stress the sustainable part, STARGATE also considers the noise and waste generation in addition to emission.

3   Overview

3.1   List of Projects

No.	Name	Website
1	SENSE	https://cordis.europa.eu/project/id/769967
2	MODULUSHCA	https://cordis.europa.eu/project/id/314468
3	ICONET	https://cordis.europa.eu/project/id/769119
4	CO3	https://cordis.europa.eu/project/id/284926
5	FENIX	https://fenix-network.eu/
6	DISpATch	https://mobi.research.vub.be/en/dispatch-project
7	FEDeRATED	http://www.federatedplatforms.eu/
8	Digital Gateway 2 Government	https://vil.be/en/project/digital-gateway-2-government/
9	ePIcenter	https://cordis.europa.eu/project/id/861584
10	STARGATE	https://cordis.europa.eu/project/id/101037053

3.2 List of Platforms

Name of Platform	Website
Xrail	https://www.xrail.eu/intro
Raildata	https://www.raildata.coop
Export Manifest	https://www.nxtport.com/en/market/live/export-manifest
Import Consignment	https://www.nxtport.com/market/live/import-consignment-api
Port Directory	https://www.nxtport.com/market/live/port-directory-api
Port Call +	https://www.nxtport.com/market/live/portcallplus
Port Stays	https://www.nxtport.com/market/live/portstays
Push Barges Location	https://www.nxtport.com/market/live/push-barges-location
Qronoport	https://www.nxtport.com/market/live/qronoport
Terminal Events	https://www.nxtport.com/en/market/live/terminal-events
Tresco Location	https://www.nxtport.com/en/market/live/tresco-location-api
UN/Locode	https://www.nxtport.com/en/market/live/unlocode-api
VGM: Method 1	https://www.nxtport.com/en/market/live/vgm-method-1
VGM: Tare Weight	https://www.nxtport.com/en/market/live/vgm-tare-weight
VisiGIP	https://www.nxtport.com/en/market/live/visigip
Green Lights	https://www.nxtport.com/market/pilot/green-lights
Next Mode of Transport	https://www.nxtport.com/en/market/pilot/nmot
C-point	https://www.c-point.be/