LL #15 Optimized Port Operations by cargo owner integration (OptiPort)

FACTSHEET

30 SEPTEMBER 2022

A. GENERAL (BUSINESS CASE)

1.Objectives

- Transport and cargo tracking
- Real time data sharing between different actors in the port to enhance the efficiency and sustainability of port operated related services
- Enhanced situational awareness among the port operators through better information services to the cargo owners and transport buyers.
- Data from RFID readers in the port can be used to provide information of positions of trains on different tracks in the port and arrival and departure time of the trains
- Asset and infrastructure use management for port operators, cargo owners and transporters and warehousing services
- Reduced costs per handled product within the port, e.g., unnecessary idle time on cranes and stand-by time of personnel.

2. Main emphasis

This Living Lab addresses the demands for digitalization and increased access to data required for an increased degree of information sharing in ports related to land and seaborne transport that takes place to and from the port, as well as opportunities that the digitization creates for increased automation of operations taking place in the port and the transports going to and from the port. Integrated operations with cargo owners and the sharing of data to optimize the planning and to conduct efficient operations. The product is sawn timber being transported between the sawmills in northern Sweden to Kvarken Ports Umeå in Holmsund. In this port, the goods are transported on trucks to be stored in warehouses in the port, awaiting ships to arrive

and come and export the products to northern Africa. Kvarken Ports Umeå and its actors operating within the port facilities perform different kind of services for different kind of cargo and ships. Kvarken port Umeå is a multi-purpose port, handling many different types of cargo, such as dry and wet bulk, RoRo-cargo, containers, project cargo, sawn timber. The port is also a ferry port with Wasaline operating a ferry line between Umeå and Vaasa on the Finnish side.

Kvarken ports will demonstrate the capability of sharing time stamps associated to particular cargo operations, e.g. Forrest industry sells their product to northern Africa. Optimizing Kvarken ports operations will relate to unloading, warehousing and loading sawn timbers on “break bulk” vessels for transport to their customers in northern Africa.

Kvarken port Umeå is aiming to become a more efficient and sustainable transport hub, handling multimodal transhipment for its customers establish capabilities:

1. To meet the increased demand from the cargo owners in warehousing and stevedoring,
2. To provide even more integrated services optimizing the resources used in operations, e.g., providing information of when ships are expected to arrive and departure, actual times of when they arrived and departures and possibilities of when cargo operations are commenced and completed.

3. Challenges

- Identifying how to effectively optimize Kvarken port Umeå's port operations to meet tomorrow's digital logistics solutions based on needs and requirements from cargo owners.
- Standardizing the sharing of business critical data -not being non-business sensitive data - between involved actors, a higher information transparency can be reach.
- Organising internal coordination within the port as well as expectations on warehousing and re-loading operations. The aim is to share data on:
    - on available cargo in the port, expected cargo to arrive to the ship, cargo loaded on the ship per day and how much is left until ship is loaded
    - outgoing transports from the port with information regarding planning of arrival and departure of ships and unloading and loading of the ships.

4. Transport mode

Road (trucks), Sea, and potentially Rail

5. EU Map Focus

the Atlantic, the North Sea - Baltic corridor and Scandinavian – Mediterranean corridor.

6. Geographical coverage

Sweden, the export to Northern Africa

7. Actors/SMs

- RISE,
- INAB,
- Kvarken ports,
- NLC Ferry,
- Wasaline,
- AF Shipping,
- Swedish Transport Administration,
- Forrest product producers which will have their goods being shipped

8. Forecast scaling outside LL

This LivingLab is related to the Swedish project I.Hamn (Digitalization, automatization and electrification of small and medium sized Swedish ports) aiming to the development of ports as transhipment hub and SIMC and BetTerFlow and have the potential to be scaled up to other ports working as transhipment hubs and have multimodal transhipments. Example of such scaling could be on how transport hubs can use Radio Frequency Identification (RFID), based on the collaboration with LL#5, to monitor tracks in the port, and tracks arriving to and from the port and being used to monitor where in the port they are standing. Another example is how ports can use arrival and departure estimates and actuals combined with pilot data, times of pilot booked, estimates and actuals of pilot commenced and completed (in collaboration with LL#7) to increase the predictability of ships arrivals and departures from ports to increase planning of and executions of ship related services.

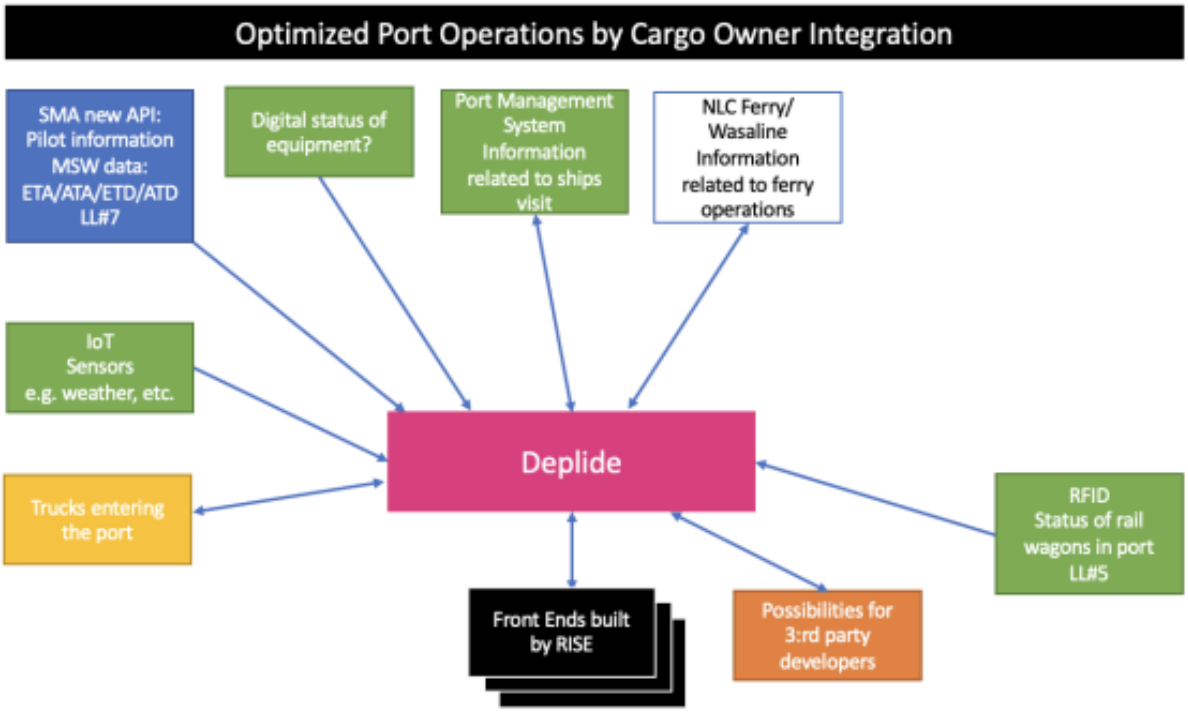
B. TECHNICAL SETTING

9. ICT vs physical

Kvarken Ports Umeå is in the process of implementing a Port Management System (PMS), which creates possibilities for the port to digitally share information between different systems and platforms, which needs digital information from the port. The

implementation of a PMS is also a step to meet: 1) the increased demand from cargo owners in warehousing and stevedoring, but 2) also to provide even more integrated services optimizing the resources used. The requirement of the PMS is among other needs also based on identified requirements identified within the project.

When the PMS is in place the port will share data from it with the Research Platform "Deplide" developed by RISE to demonstrate and evaluate services complementing the PMS. Deplide is a flexible data sharing platform based on the open-source solution Kafka. Deplide is designed to be both vertically and horizontally scalable and complying with the leading principles defined by FEDeRATED. This approach allows the LivingLab to experiment and explore new services based on data sources such as IoT sensors, events from different systems such as planned and actual events in relation to goods transportation.



This Living Lab deals with the following FEDeRATED global features:

- Language
- Access
- Identity
- Findability

10. DTLF implementation option:

B. Single Platform
C. Multiple platforms

This Living Lab will use the research and innovation data information sharing platform Deplide to share data between different actors involved in the Living Lab. Deplide will connect different systems and devices for data sharing and develop different Front-End applications will be developed to visualize data and to enter data for the actor not having digital connectivity.

C. ORGANISATIONAL ASPECTS

11. (Potential) Impacts

- Use of a data sharing environment and an increased situational awareness among the involved actors based on digital information (qualitatitve);
- Use and availability of connected data sources, e.g., estimates versus actuals of ships arrivals to the port; estimates based on machine learning versus actuals of ships arrivals to the port; estimates of ships departure versus actuals from the port; turnaround time of ships coming to the port; estimates of cargo operation completed versus actual cargo operation completed (quantitative);
- By combining and sharing data from multiples data source better basis for understanding if actions will occur according to plan, when will it happen and when did it happen;
- Sharing of data between different actors involved in joint operations, eg., providing different services to a ship, creates possibilities for the involved actors to better plan and execute their operations. Just-in-Time operations;
- Better basis for increased capacity utilization;
- Reduced administrative burden;
- Basis keeping track of cargo movements in the port;
- Better basis for decisions for involved actors;
- Better basis for billing of conducted goods related services;

12. Risks

- COVID pandemic having adverse effect on cargo import and export organizations;
- Supply chain disruptions and lack of semi-conductors slowing down delivery of equipment and implementation of physical infrastructure;
- Potential delay in access to data, lack of personnel and physical meetings due to the pandemic could cause delays;
- Lack of access to digital data for demonstration due to, e.g., being not collected digitally by organizational systems or costs related to integrations of some of the information;

- Lack of knowledge of stakeholders on data sharing and not understanding the importance of real-time data sharing when it comes to manual input of data in Front Ends;

13. Timing

LL#15	2019				2020				2021				2022				2023			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Preparations																				
Planning and scoping																				
Stakeholder engagement																				
LL infrastructure development																				
Testing & piloting																				
Iteration & process analysis																				
Operational trials																				
Feedback & scaling																				

14. Contact

Mathias Karlsson, Researcher, Digital Systems, RISE, mathias.karlsson@ri.se
Mikael Lind, Senior Research Advisor, Maritime Operations, RISE, mikael.lind@ri.se