Intermodal data sharing for terminal yard management purposes

A talk with Paolo Lunardi & Giovanni Petroli on Living Lab#12[1]

Paolo Lunardi and Giovanni Petroli work as project managers for Zailog, the research and development department of the Verona freight village in Northern Italy. Together they coordinate Living Lab #12 Terminal Track and Trace System*, which focusses on an intermodal rail-road terminal in Verona. Their expertise is not so much technical as organizational, and they also deal with the marketing and communications within the Zailog-projects. For the interview they sit side by side, like brothers. They form a team and in discussing the topics that come to the table, they constantly complement each other, which is why it was decided to let them speak as if from one mouth in this interview, called Paolo & Giovanni.*

The use case of Living Lab #12 is pleasantly clear. It is all about a train terminal in the freight village of Verona, where cargo trains come and go. Often northwards, for example to Hannover in Germany. Besides the modality rail, the modality road is involved. Trucks come from all over Italy to the terminal, to bring the goods that need to be loaded onto these trains. In this Living Lab they work with the trucks of Codognotto. And the trailers on these trucks are equipped with IoT-tags, in order to track their location.

Paolo Lunardi

Asking about Zailog, the organization they work for, Paolo & Giovanni say: “Zailog is the company that deals with Italian and European funds and projects. We also promote the actions and operations of the Verona node at fairs, congresses and so on.” Talking about their own role within Zailog, they say: “Our main function is to manage the European projects of the Verona freight village, to foster marketing and communication, and to deal with the operators that are interested to make

[1] *Interview by Mionne Buwalda*

business in the area." They continue explaining: "We have an internal IT-department called Quadrante Servizi, which officially is a different company, but it is closely tied to Zailog. This IT-department of the node is involved mainly in the management of the terminal operations of one out of three terminals in the area. They provide the IT-services for this node, like the data cloud, disaster recovery, internet provision, etc. And they manage the shunting operation in the yard, so the towing of wagons from the railway station to the terminal."

The momentum is back in the project

For Living Lab #12 a lot changed since the spring of 2022. In the factsheet from early 2022 there is still talk of the objective to 'reduce empty running of trains', which seemed to imply the co-loading of trains, but Paolo & Giovanni say that "this has changed, because we decided to focus more on the terminal and less on the trains. It is all about the yard management of the intermodal terminal now, so the trucks do not have to waste time". And: "It was many months ago that we made the factsheet, and now we know far better what we are going to do."

Giovanni Petroli

Paolo & Giovanni continue talking about changed perspectives in their Living Lab. They say: "As the name of our Living Lab –*Terminal Track and Trace System*– suggests, the focus was mainly on the transport connection and the tracking and tracing of loading units, but the focus has changed slightly in recent months. Now our main scope is running the terminal as efficient as possible, and for that we need to optimize the yard management." They even considered changing the name of the Living Lab, "but yard management is also about the tracking and tracing of the loading units within the yard, so in that sense the name is still relevant."

In May 2022, Living Lab #12 hired an external IT-company to speed up the project: "Since we were delayed, we decided to get the help of an IT-company to help us move forward with the Living Lab, because at the moment our own IT-department Quadrante Servizi is very busy implementing the Terminal Operating System (TOS) and did not have time to work on the Track and Trace platform (T&T) that is going to be placed between the TOS platform and Codognotto's Transport Management System (TMS). So now we expect to move ahead quickly again."

The external IT-company assists Zailog in developing and implementing the system requirements of the T&T platform. Paolo & Giovanni: "With these technical guys at our side we can give more accurate details in the upcoming factsheet." The entry of the external IT-company within the Living Lab makes that the project has gained momentum: "The T&T platform is going to be implemented

in the coming weeks, in cooperation between the tech-guys from Codognotto and these external IT-experts we hired."

A new diagram

Paolo & Giovanni share their screen, to show the new diagram they work with now. "We have a clearer view of what we want to achieve at this moment; we know how to achieve it, and the physical implementation of the T&T platform can get started now."

They explain what can be seen in the diagram: "On one side we have our TOS, a platform in which the terminal operator and the railway operator share information, for example on the composition of the train, the UTI position, the UTI delivery, the booking slots, etcetera (EDIGES data). And on the other side there is truck operator Codognotto and its TMS, gathering and spreading the information from the IoT-tags. By way of API's we then combine the information from the Verona TOS and the Codognotto TMS in a platform in the middle, the Track & Trace platform that is being developed now, in order to optimize the yard management of the terminal." Eventually other trucking companies can also connect by way of this T&T platform. And: "If we manage to make this T&T platform work, we can eventually include it in the TOS of our terminal. Now the TOS has the needed rail data and all the terminal data, but it would be good to include the road data from the T&T platform as well."

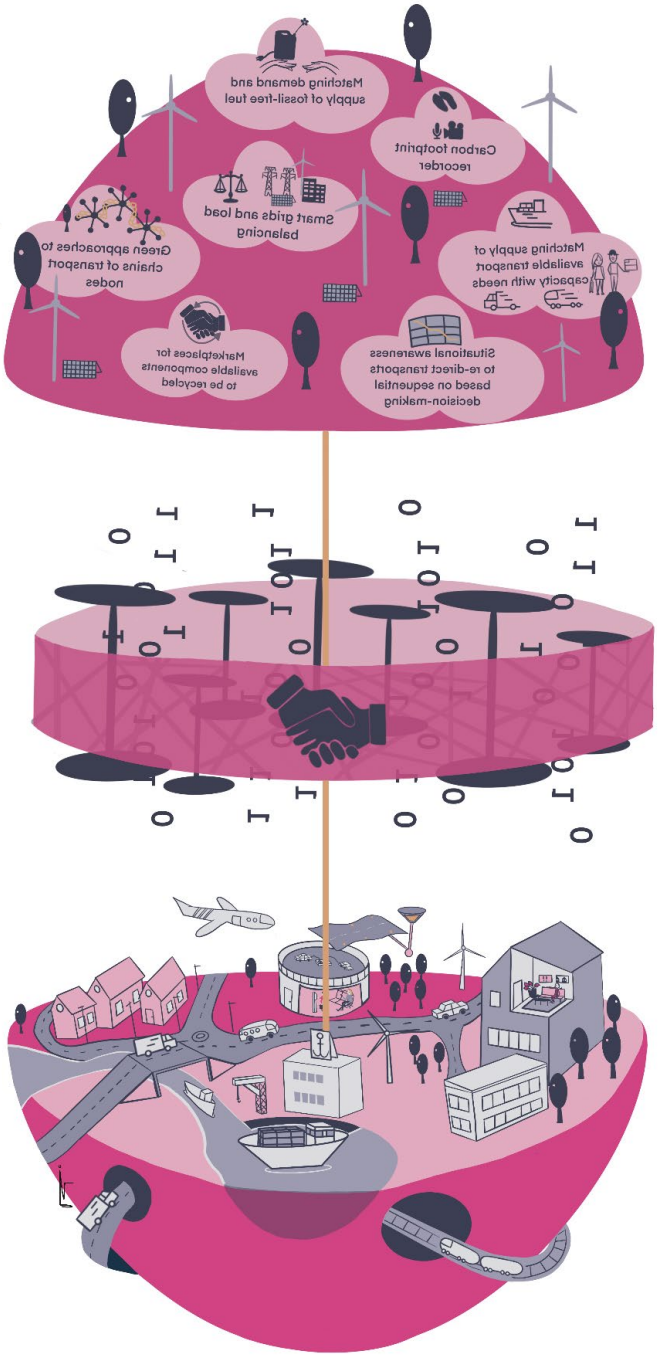
Paolo & Giovanni seem happy with the new diagram, and use it to explain how 'feedback messages' work: "It starts at the TMS of Codognotto, where they propose an ETA for a truck to arrive at the terminal to our TOS. The TOS will then feedback information to Codognotto's TMS about the expected arrival of the train and eventual delays. When there is a delay, the truck will not leave, in order to prevent congestion at the gate of the terminal. When the train is expected in time, the TOS will inform the trucking company that the truck can start driving and use the 'fast lane'. We foresee a prebooking system in our Living Lab, to provide access to this fast lane by way of a QR-code. The truck driver gets a dedicated slot in the yard." It is all about bringing data together for yard management.

FEDeRATED-functionalities and measurable results

As Paolo & Giovanni are not tech-guys, they cannot go into the FEDeRATED functionalities Semantics, Identity, Access and Findability in great detail, but leave that to the external IT-company. They do want to learn more about it though: "These meeting we have now, in Delft and Malaga, are key for us, because we can get a better view on what is needed concerning these concepts. But the implementation will be by the external experts and our own IT-guys at Quadrante Servizi."

Asking about the implementation of the FEDeRATED-semantics, Paolo & Giovanni say: "Codognotto's TMS is built on 'road language', while the TOS of Verona Freight Village is built on 'rail language'. We know the TMS is not able to talk to the TOS right now. We want to connect these platforms using a core language, by putting this T&T platform in the middle, like a bridge. We discussed this with the external experts and they will implement the FEDeRATED semantics."

Paolo and Giovanni expect to have their Living Lab implemented beginning 2023. Asking about measurable results, they say: “We talked about that with the external expert. We can produce data on how long it takes for a truck to go through the terminal operations; we can calculate the average cycle, based on the present data in the TOS. And we can measure this time period after the implementation of the Living Lab architecture. That is our main KPI. One of the main features of the T&T platform will be the booking system for the terminal and the fast lane connected to that. The overall lead time for loading/unloading should be shortened, just like the waiting time outside the terminal. Connected to that are goals like less traffic congestion near the terminal and less CO_2-emissions.



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