Trucks as IoT-nodes
A talk with Toni Penttinen, COO at Ahola Digital, on Living Lab #23[1]

Toni comes across as the epitome of digital competence. One could call him a data wizard. But Toni also has his feet firmly on the ground, for he knows about the actual world of transport and logistics. His professional home is Ahola Digital, a Finnish trucking & digital logistics company with some 600 trucks. As COO, Toni is responsible for the 'operations' of his firm –so, pretty much everything–, including product development and skills management. Besides being a realist, Toni is nerd enough to embrace digital reality. He gladly shares his screen, and I see a tiny fraction of Finland, with a lot of lakes and few roads, till Toni focuses out, and I see all the operating Ahola trucks on the map, as little strips of code. Of course, many trucks can be seen in Finland, but there are also a lot in Sweden and the Baltics, spreading into Poland, and Germany, on their way to several central European destinations.

Apart from the location data, Toni has a lot of other real-time data on 'his' trucks, their contents and their drivers. By way of bringing together data from telematics –as Toni calls sensor and location technology along with third party provided data– and Ahola's transport management system, he creates overview and insight, and the possibility to realize new data services for his clients. Toni: "We know the weight, the speed and the fuel consumption of each truck; we know where they are heading and when they load or unload. We know how many kilometers are driven with an empty load, the resting periods of the drivers, potentially even how often they hit the brakes or change gear."

For Toni, every truck is an IoT-node, and of course, all the gathered information can be analyzed and combined in order to be able to achieve sustainability goals, by optimizing the fleet's performance in various ways, e.g. through route optimization, filling degree optimization, empty driving optimization, driver performance monitoring (green wheel index). And the customers of Ahola, the shippers, can be given real-time data on what is going on with their goods when on the road. Toni: "That way they know

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[1] *Interview by Minne Buwalda*

what is good service and what is not." And: "The trucks and trailers are not that important. It is all about the cargo." Toni's company is also working on providing CO_2 emissions reporting on the multimodal transport, which is becoming an increasingly decisive factor when goods owners select a transport and logistics partner nowadays.

Basically, it is all about creating digital visibility, for internal company use and for Ahola's clients. Ahola seems to have its digital affairs in pretty good order in their own modality, which of course is road transport. But in order to exchange data end-to-end in multimodal chains, other players, like port and terminal operators or ferry and rail operators, have to share their data. Since such visibility was largely missing, Toni dedicated Living Lab#23 to the creation of multimodal data exchange on the Scandinavia-Mediterranean corridor.

LL#23 Realtime Multimodal Transportation Visibility Platform Services

The LL#23-business case is mainly based on the digital needs of one specific client of Ahola Digital: steel company SSAB, one of the biggest steel companies in the world, with its head office in Sweden, and branches in Finland and the USA. The main 'leg' that is covered by LL#23 runs from the SSAB steel factory by rail to the Finnish harbor of Hanko, then by ferry to the German harbor of Rostock, and onward by rail or road, into central Europe. The multimodal data exchange covered here is B2B data exchange.

Toni explains: "It starts with shipper SSAB. They inform us about certain steel products being loaded at their factory's train terminal. We then get ETA's, location data, and data on what goods are in what wagon from VR Cargo, the Finnish train company that drives the goods to the harbor of Hanko. There the cargo gets loaded onto a vessel, and we get notified when this happens by the Hanko stevedoring company. Then we get the ETA for the ship to arrive in Rostock, and we get informed again by the Rostock stevedoring company when the goods are actually taken from the vessel and are being loaded on trains of Deutsche Bahn or on trucks." Another, smaller use case within LL#23 handles data exchange on another corridor: the one between Finnish Raahe harbor and the port of Antwerp, where terminal operator TMA Logistics delivers information on goods being put on trains that may drive all the way to Italy.

Asking about the type of data that are exchanged in LL#23, Toni lists a range of data: "Shipment identifiers, carrier identifiers, timestamps, location data, loading/unloading events, ETA's/ATA's and foreseen delays, status messages, register plate information ..." He continues: "We have the Rest API's for this in place."

Problems are there to be learned from

As COO of a digitally highly evolved company, Toni comes across many supply chain partners who are far less evolved. He says: "The digital management systems of many port operators are not yet able to take advantage of real-time information –think about estimated arrival times of trucks, or digital papers like waybills to enable automated onboarding processes– because they do not work with time slots yet, or because they have no yard management in place. Even when they are offered
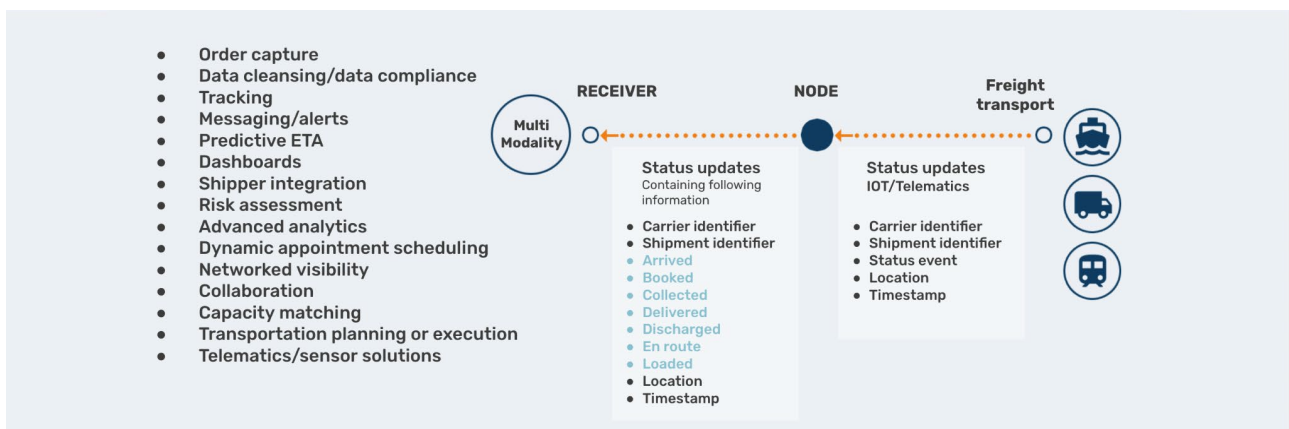
real-time information about the arrival of trucks, those trucks still have to wait." Of course, that way the gain in terms of efficiency is still zero.

In the case of his pilots within LL#23, Toni came across quite a lot of such challenges. He comes with examples: "Rostock harbor is owned by Euroports, which owns quite a lot of ports in Europe. In order to accomplish transparency among corridor partners involved in the logistics chain, we designed and developed a web service for them called Logistics Flow Manager. That boosted their productivity and partners' visibility in transportation. Concerning Deutsche Bahn, the German railway company that carries SSAB-products from the harbor of Rostock into central Europe, Toni says: "Digitalization of railroad information is still in the early days of maturation. More and more information is being shared through API's, but some areas would still benefit from development."

According to Toni, the initial ambition in the business case with SSAB went even further than just bringing visibility to the supply chain: "Eventually, we were planning to take the manufacturing process from a SSAB-perspective and connect those manufacturing data to the logistics information. That way you can upgrade your sales operations as a steel factory, for you can give premiums to clients who buy goods at certain times, when those goods have been produced. That way, there is less need for warehouse storage and factory operations get leaner."

But in the meantime, SSAB has decided to work with a big commercial logistics visibility platform called FourKites. Ahola continues to provide data on their trucks to FourKites, but because of the new situation, Ahola Digital is building down its FEDeRATED use case with SSAB, while utilizing the gathered experience and knowledge and focusing on building on this a little bit more regarding sustainability, together with SSAB and other goods owners and logistics companies. This is mainly done in cooperation with Living Labs #14, which focusses on Kvarken ports. Toni: "We have been implementing pretty much everything that was needed and actually got beyond the original set-up of LL#23. The proof of concept has been given. The benefits have been proven to SSAB"

A simplified version of the shipment tracking status event message utilized in AHOLA

Toni stresses that some problems that are encountered in his Living Lab cannot be resolved within the timeframe of the project. He starts talking about implementing eFTI: "The process is still very unclear and many things are not decided upon yet, for example, what network access points are

being used in the ports of Finland." To this, he adds: "We need a next-level multimodal kind of eFTI and eCRM."

He continues: "For us, this LL#23 is very much like an umbrella, under which many topics and challenges pop up simultaneously. And many problems we encounter must be solved in a broader context, not only in the context of our company, business case and Living Lab." Toni mentions the state of digitization of the majority of European road transporters, which are SMEs: "How do we get this mass of small companies involved in digitization, that's the question. The big trucking companies in Europe are not the problem, but the small ones do not have the power to do it by themselves." And then there is the problem that many logistics and transport companies do not want to share data, which makes it even more important to achieve solutions like blockchain immutable data sharing. According to Toni, these are all problems that are touched upon within the context of the FEDeRATED Living Labs.

Blockchain trust and FEDeRATED Functionalities

In his fact sheet on LL#23, Toni writes that one of the objectives of the Living Lab is to 'develop a chain of trust by way of certificates'. Asking about the meaning of that sentence, Toni says: "We are working on a hyper-ledger foundation fabric which gives the immutable, irreversible history of the information. This creates trust in the information. Take the example of a waybill. By way of this hyper-ledger, the waybill can be tracked down to its origin, building trust, for example, among authorities." He comes with an example: "If the authorities can trust the information on the electronic waybill, which is coupled with the license plate number, they do not need to stop and check the transport in a lot of cases." Now that's efficiency for businesses and authorities.

Asking if these blockchain-based solutions fit in with the FEDeRATED architecture, Toni says: "They fit in well and they are also used in the Spanish Living Lab. From the point of view of interoperability, the question is more about how to combine different implementation strategies, in order to be able to share data in an interoperable way.

Concerning interoperability, Toni continues on the matter of Semantics: "The question is also how to understand each other's data within the FEDeRATED network." Concerning the IATA workshop that has shortly been given within the FEDeRATED context, Toni says: "The IATA semantics fit well with the modality of air cargo, but less with for example maritime or road transport. It all has to do with vocabulary." Toni gives an example: "In the maritime sector they work with the bill of lading, which is called the waybill in road transport." But such semantic problems can be solved? "Of course."

Concerning the functionalities of Identity and Access, Toni says: "Distributed Identity management has been one of the research areas within the FEDeRATED Architecture Group. There are several options here, but choosing one will not be easy. It requires access rights management. Big companies like Microsoft, Google and Apple work on this problem as well. How to provide access without passwords, but with a high level of trust." According to Toni, there is a difference here between B2B data exchange and the exchange of data within last-mile delivery, where it is about
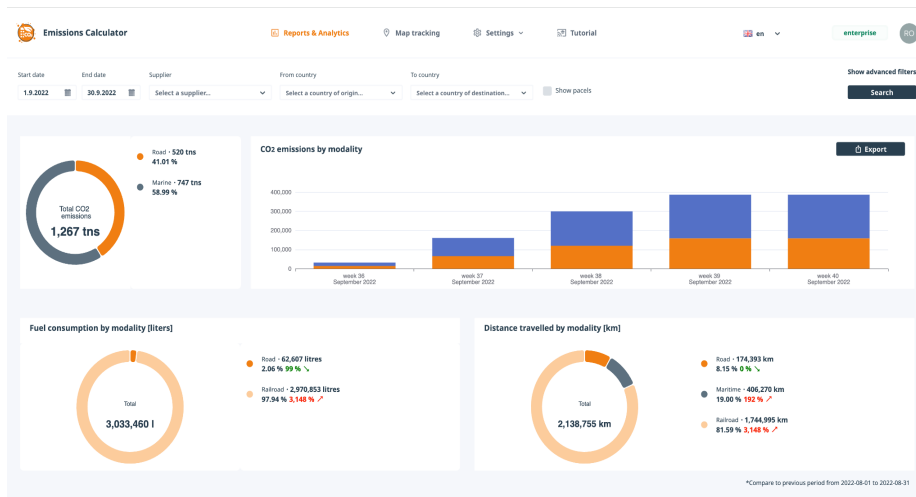
information sharing on the consumer level. He should know, for Ahola Digital not only focuses on long haul transport and logistics, but also on digital logistics around last-mile delivery.

Sustainability

Sustainability is an important topic within Toni's organization. "At the moment we place a lot of energy in providing digital insight into CO_2 emissions and, more in general, in how to optimize logistics, so we produce less emissions. Optimizing the Ahola-fleet and using biodiesel or hydrogen is part of our sustainability strategy, just like realizing logistical efficiency, in order to prevent empty kilometers." Toni is proud of the accomplishments of his company in this field: "The EU set certain standards for CO_2-emissions in 2030, but our customers have already fulfilled those standards for some years now, verified by DNV accreditation service company. So, we are at least ten years ahead here."

Concerning CO_2-monitoring, Toni has the fundamentals in place within his own company. Toni: "We have data from the telematics systems on the road transport, along with the data from the Transport Management System. But end-to-end monitoring is still a challenge, due to all the existing information gaps." Toni comes with an example: "While sustainability reporting has been part of the maritime sector for quite some years now, it is only on the level of the vessel, and not on the level of the shipment, be it trucks or trailers. So, there is still a lot of work to be done here." He continues: "As soon as they can give us CO_2-data on shipment level, we can go beyond that. This is because we can then further diversify the CO_2-emissions on the transported goods, because we have the data on the multiple owners of the goods in a truck or trailer."

Ahola emission monitoring overview graphs

Toni sees possibilities to realize end-to-end visibility in CO_2-monitoring quicker based on his present discussions with *LL#14 Sustainable Intermodal Chain*, where they work with ferry company Wasaline, which operates between the harbors of Umea in Sweden and Vaasa in Finland. Toni: "When Wasaline can provide us with such information on shipment level through an API, we can close the information gap in our end-to-end CO_2-monitoring. When, at the same time, Wasaline gets the ETA's, license plate registration, driver information along with the cargo information of our

trucks, they can use those to streamline their port operations, which in turn is helping our efficiency again."

Looking back and ahead

Asking Toni if he learned anything within the FEDeRATED context, he says: "We are keen to learn, to share knowledge and possibly data, and get better at what we are doing. The FEDeRATED discussions brought new ideas. It helps, especially in areas that have not been developed yet."

Asking when he considers his FEDeRATED Living Lab successful, he says: "I already consider it successful. The set goal, multimodal visibility, has been achieved. Maybe a problem is that we narrowed the project too much down in the beginning. So now we are evolving the project to the next level, on topics like CO_2-monitoring, eFTI, port operations, or more in general: how to share data and knowledge with FEDeRATED-partners."