Harmonizing European interoperability solutions
A talk with Marco Gorini on LL#18 Smart TSGate[1]

In the field of European digital logistics, Marco Gorini seems to play all strings at once. He easily switches from the local level –e.g. Terminal San Giorgio, the subject of our talk– to the regional level –-e.g. the Southern stretches of the Rhine-Alpine and Baltic-Adriatic corridors– all the way up to the overarching EU-level, for Marco coordinates several European logistics projects on behalf of his company Circle Group. Marco is outspoken and he sounds confident.

Marco Gorini has been working in ICT for quite some years now. He started as a software engineer in 1986. Back in the days, computers were still bulky stand-alone desktop computers, and Tim Berners-Lee had not even invented the World Wide Web yet. After that, it would take at least another decade before the world really got used –and addicted– to the Internet. Perhaps this long history gives him the self-confidence one hears in his voice.

Over the years, Marco moved up the corporate ladder, and since the end of 2019 he is a consultant and project leader for ICT-supplier and consultancy firm Circle Group, a major player in Northern Italy. Marco serves clients like Terminal San Giorgio. Besides that, he is 'the spider in the web' of European projects for his company.

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[1] *Interview Minne Buwalda*

Genova, the residence of Marco and the location of Terminal San Giorgio, is nestled on a narrow strip of land between the Mediterranean Sea and the Ligurian Alps. This specific geographical position makes infrastructure management a necessity here, and FEDeRATED Living Lab#18 could help with this. The city also has a rich maritime history. Together with Venice, it was one of the most powerful city states that developed along the Mediterranean coast.

FEDeRATED LL#18 Smart TSGate and other EU-projects

For Terminal San Giorgio (TSG), a beneficiary of the FEDeRATED-project located in the port of Genova, it is all about streamlining the transport of trailers by way of IoT-technology and data exchange. The modalities involved in this Living Lab are Maritime and Road, while Rail is covered by other EU-projects. Although TSG is the sole project beneficiary of LL#18, its technical and administrative management is supported by Circle Group, which is also responsible for building and maintaining the Terminal Operating System (TOS) of TSG.

The data exchange between Terminal San Giorgio and shipping company Grimaldi involves ETA's and locations of ships transporting tracked trailers, while for trucking company Luigi Cozza several data services are being developed, for example 'trailer ready for pick-up' and 'trailer pick-up booking'. The data services that are developed within the framework of FEDeRATED LL#18 should create faster access for trucks to the terminal, more synchromodality, and better infrastructure management.

Besides FEDeRATED, for which Terminal San Giorgio is the beneficiary, Marco mentions three European comparable projects the Circle Group participates in as a beneficiary: FENIX, E-Bridge and I-RAIL. Marco: "The E-Bridge project also deals with Terminal San Giorgio, in the sense that it is about providing interoperability between the terminals in Genova and Savona with the Port Community System (PCS), Multimodal Transport Operators (MTOs) and Customs." E-Bridge was organized to mitigate some of the infrastructural problems that arose following the bridge Morandi disaster in Genova in August 2018.

An evolutionary approach

For Marco, these separate European projects clearly hook into each other, which is reflected by 'the evolutionary approach' that is taken in LL#18: "In the FEDeRATED Living Lab we follow a three-phase approach, in order to establish some kind of evolution."

In phase 1, Terminal San Giorgio has laid down a minimum set of technologies that will enable the operational assessment of new functionalities and services that accompany the fulfillment of Living Lab#18. This includes the digitalization of processes that still require some human activity, aiming to achieve fluid gate-in/gate-out operations and dematerialization of documental procedures, and the provision of basic interoperability between legacy ICT platforms. One example is the application of IoT-tags on trailers by trucking company Luigi Cozza and the software interfaces between the automated (IoT) gate, the TOS and the truck management portal. This stage also includes the

harmonization of operational procedures among interested parties and the collection of baseline indicators (KPI's) to evaluate the overall operation of the Living Lab.

In phase 2, the stage LL#18 just entered according to Marco, "interoperability between the TOS of Terminal San Giorgio and the platforms of shipping company Grimaldi and trucking company Luigi Cozza is implemented, based on the FEDeRATED principles and architecture". He continues: "Terminal San Giorgio and Grimaldi in the meantime reached a peer-to-peer agreement on the exchange of ETA's and data on the actual location of the ships, based on these guidelines and principles."

Marco: "Thanks to the IoT-tags installed on trailers, the trucks can enter Terminal San Giorgio through a dedicated lane and pass through the gate. We will get data on this 'gate event', while we have all the specifications on that specific trailer in our Terminal Operating System, including the consignment note, which is coupled with the IoT-tag. This then will unlock a series of automated procedures that used to be made by way of paper documents, resulting in the trailer being brought onboard the ship, and the system creating a new 'event' by confirmation of the tag. Based on that, the Grimaldi system will deliver an ETA for the ship to arrive in its port of destination." And: "The other way around we start with the ETA's we get from Grimaldi, and then build information services for trucking company Luigi Cozza on that. We first adjust the estimated time of arrival with the actual time of arrival of the ship. Based on that we can reschedule the terminal operations on that specific trailer and we will inform the truck company when the trailer will be ready for pick-up, so they can book the terminal through the system."

Marco: "Eventually, when phase 2 is completed, the truck company will be able to access information on a trailer being ready for pick up, and then book the pick-up of the trailer in Terminal San Giorgio by means of a web service exposed by its TOS, thus implementing a full-digital workflow." Yet, LL#18 is still at the beginning of its phase 2, meaning that the truck company still has to access the information manually, via a website. Marco: "The web service is not yet ready, and until now we only use a limited number of tags on trailers." Asking about the realization of all the plans from phase 2, Marco says: "Full operational stage will probably be achieved by the end of 2022. By that time, Terminal San Giorgio will make the trailer information/booking service available and will deliver some hundreds of tags to Luigi Cozza (and potentially to other trucking companies), thus enabling the full-digital interoperability and fast access for a valuable number of trailers." To this he adds: "Parallel with this we are going to work on implementing the FEDeRATED semantic model, in order to comply with the FEDeRATED-directives."

In phase 3, Marco foresees a merging of two European projects: "We want to further expand on the results from phase 2 of the FEDeRATED Living Lab, possibly in cross cooperation with FENIX, and create interoperability between the Terminal Operating System of Terminal San Giorgio and other IT-systems, like Port Community Systems and Customs."

The role of Italian authorities and stakeholder involvement

Pointing at the fact that, at first sight, the Italian Living Labs within FEDeRATED are all initiated and run by private players, and there do not seem to be any Italian authorities directly involved, Marco admits that "lack of participation of Italian authorities within the FEDeRATED project may look somewhat strange", yet, he does not see this as "a national attitude". Marco: "Out of the four EU-projects I run at Circle Group, Italian Customs participates in one, three Port Authorities participate in four projects, and the Ministry of Sustainable Infrastructures and Mobilities coordinates all Italian partners in FENIX; so I think that in general Italian authorities are well committed towards research and infrastructural projects."
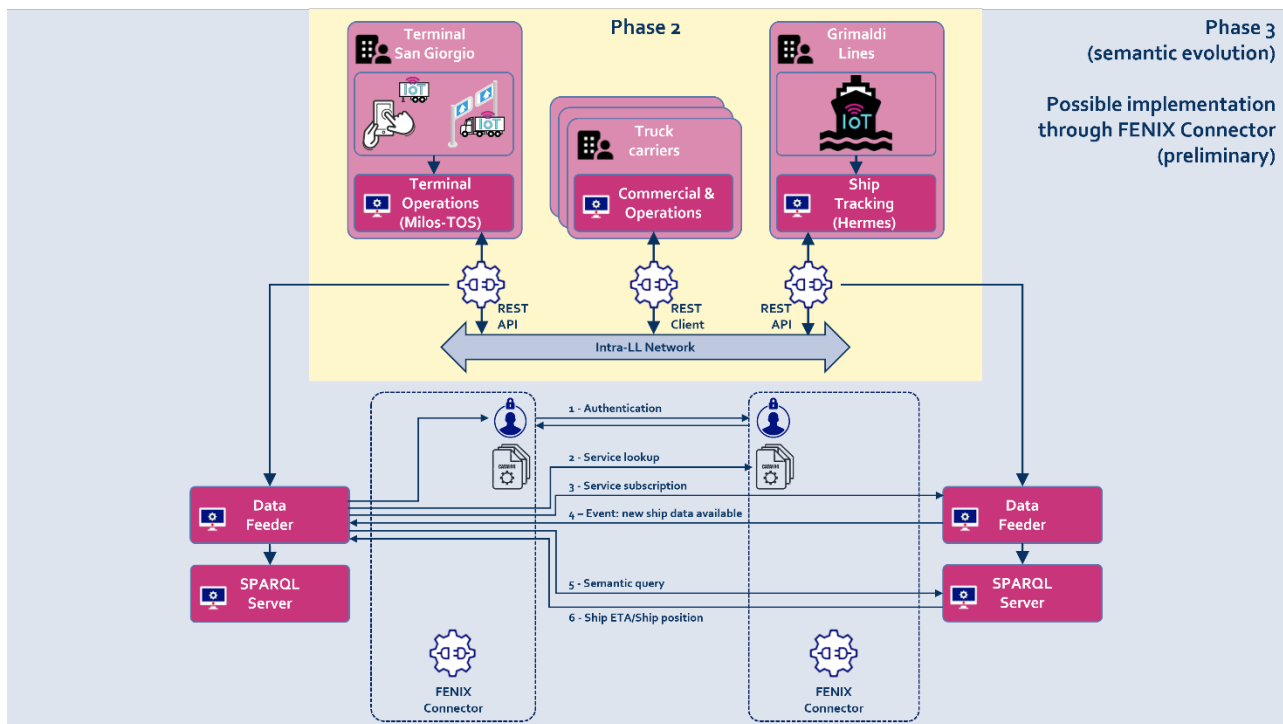
Concerning stakeholder involvement Marco makes a clear distinction between the involvement of authorities and private companies. "As Circle Group we are in close cooperation with the Port Authorities of Eastern and Western Ligurian Sea (La Spezia, Carrara, Genoa and Savona), with the Port Authority of the Northern Adriatic Sea (Trieste), and others. We have good relations with Customs as well. We work together with these authorities in a number of projects." Yet, "with private companies (especially SMEs) it is sometimes more difficult to get them involved, because there may be some lack of information about how funded projects work, and also some skepticism about sharing data."

FEDeRATED and FENIX

Marco finds some complementarity between FENIX and FEDeRATED, resulting from his participation in both projects: "FENIX is strongly oriented towards technical interoperability; indeed, the project designed and specified a standard connector, which has been implemented by all the platforms in the network, so that one is able to connect with each other in a uniform way. Talking about FEDeRATED, Marco says: "FEDeRATED focusses more on semantic interoperability, through the provision of general guidelines and leading principles. The Architecture Group proposed

architectural options and the Semantics Group now works on semantic interoperability, but we did not have strict specifications on how to technically interconnect within the FEDeRATED context." He continues: "As an IT-man, I expected specifications for some kind of FEDeRATED connector when we started, and I was surprised this did not happen."

Therefore, LL#18 started working on implementing FEDeRATED 'leading principles' and 'architectural options' at local level, and then shared them with LL#10, based on a peer-to-peer agreement with Grimaldi. Marco shares his screen and shows a list of FEDeRATED principles, supplemented by agreed upon interpretations and consequent decisions taken by both companies. Marco: "But when we want to exchange data with other FEDeRATED Living Labs, this is not automated, thus not truly interoperable yet, despite the common leading principles we use. So, we have to sit around the table again to find agreement on such basic issues. This is exactly what is happening now with the workshops on semantic interoperability led by IATA"

Access and Identity

Access rules are not necessary in the present phase of LL#18, since such policies have been negotiated peer-to-peer with Grimaldi and Luigi Cozza, and the authentication is based upon the exchange of predefined tokens; however, this topic is crucial in view of the upscaling of the services to multiple stakeholders. Marco: "Eventually, we make our services available to other partners too. Then it is time to implement dynamic access mechanisms." Asking him about the FEDeRATED access procedure called Publish and Subscribe, he says: "The Terminal Operating System of TSG is already prepared to work this way."

About the access rights for the B2B data exchange between TSG and Grimaldi, he says: "Here we work with a very basic form of identification, which is by way of a token that is given to TSG by Grimaldi, and this token provides access to the needed data."

When I touch the subject of Identity, Marco voice changes: "This is a very tricky topic, which is common to all distributed architectures; for instance, we are currently supporting DG MOVE in the development of specifications for the EU Regulation 2020/1056 on electronic freight transport information (eFTI), and also in this case identity management is at the very heart of all the architectural options under investigation. There are several alternative solutions ready, and it would be very important trying to harmonize them as much as possible across multiple projects and running platforms." He continues: "Dynamic access and identity management are part of the FENIX connector specifications, while so far, they have not been strictly defined by FEDeRATED. I expect more specifications from FEDeRATED on this issue in the coming months and year."

Weaving FEDeRATED and FENIX into one

Marco sticks to his main point: "What I see, as somebody who works both with FEDeRATED and with FENIX, is that both the projects now seem to converge to the same point, although through different approaches." He goes on: "According to the EU Interoperability Framework, there are 4 types of interoperability: technical, semantic, organizational and legal. FENIX gave great emphasis

to technical interoperability and was quite comprehensive about the specifications of the connector, while FEDeRATED concentrated on semantic interoperability and developed a comprehensive semantic model. As a matter of fact, we need both sides of the coin; or better still, we need all four forms of interoperability." And: "FENIX and FEDeRATED can cooperate and offer their strong points to each other."

Marco concludes: "FEDeRATED and FENIX are currently developing some kind of cross-piloting between their Living Labs. As far as LL#18 is concerned, the TSG Terminal Operating System, by acknowledging the FEDeRATED principles (including publish and subscribe), is almost ready to be linked to the work we did with FENIX. Our idea for phase 3 of LL#18 is to expose the services developed within FEDeRATED through the FENIX connector (natively featuring identity management and dynamic service discovery through a service broker), so that they become available to any node in the FENIX network. The purpose of this evolution is to demonstrate, possibly by way of such a cross-pilot, that the work carried out in the two projects is compatible and that they can strengthen each other contributing to the creation of a European network of federated platforms."

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