West Harbour and Old City Harbour Just-In-Time Queueing System for Heavy Good Vehicles

FINEST Smart Mobility

GoSwift

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Version: 1.1

GoSwift

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FINEST SMART MOBILITY

Interreg Central Baltic

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European Regional Development Fund

Contents

1. Executive summary

The objectives and goals of the West Harbour and Old City Harbour Just-In-Time Queueing System for Heavy Good Vehicles were to design, develop, implement and pilot a service to guide heavy good vehicles to the harbours. The service was designed for the just-in-time (JIT) arrival of heavy goods vehicles for boarding ferries and to reduce unnecessary waiting time and thereby reduce traffic congestion around the harbour area of both cities. These objectives were met and the service was shown to reduce waiting time

The service is able to guide vehicles to the port for just-in-time arrival and boarding of ferries; taking into account - traffic, weather and speed. A reduction in unnecessary waiting time has been proven during the pilot and overall the project was successful. The visibility and ease of using waiting areas for trucks, instead of parking in inner city areas has been made easier by the use of the mobile application for drivers.

The mobile application that was developed in conjunction with the service platform allowed for the collection of useful data, positioning and movement of heavy goods vehicles. This data was used to guide trucks to the port and assist drivers. The service platform provided useful data to ferry companies and was of particular benefit to dispatchers.

The project allowed for good collaborative efforts between the stakeholders to establish and for the product to prove its usefulness and viability for the continuation of the service. The introduction of remote check-in from remote truck waiting areas is a particular benefit, as parking places are reduced near the ports.

GoSwift will continue to develop the service for ports and aim to reduce traffic congestion and CO_2 emissions from heavy good vehicles within city environments.

2. Introduction

The general purpose of the current document is to report on the success of the West Harbour and Old City Harbour Just-In-Time Queueing System for Heavy Goods Vehicles, i.e. develop a service for guiding heavy good vehicles to the port just-in-time for them to get into a specific ferry.

2.1 About FINEST Smart Mobility project

The ferry connection between Helsinki and Tallinn has over 8 million annual passengers. At the moment the inbound and outbound traffic in both ports is substantially more congested compared to other city regions. Annually more than 300 000 heavy good vehicles travel through the city centres. Renewing the port area will also mean that in future years the parking spaces for heavy goods vehicles will disappear which will make it impossible for trucks to spend unnecessary time in the port areas. The Jätkäsaari region itself is currently undergoing a lot of reconstruction, this creates construction traffic and temporary traffic arrangements which results in challenges for the management of traffic. This leads to the inevitable conclusion that eliminating the unnecessary waiting in the port areas is crucial.

FINEST Smart Mobility project aims to tackle this ever increasing challenge through intelligent traffic solutions. The project provides more fluent integration of different transport modes of this inter-city and cross-border traffic by piloting and planning ICT-driven solutions. As an outcome, transportation time for both passengers and cargo will be reduced. A better flow of people and goods will result in less CO_2 emission and noise in the port area as well as in the cities. Through the cross-border approach, end-to-end and user-centric experience are ensured and better cross-border mobility planning is achieved.

The project is funded through the Interreg Central Baltic programme with a total budget of 1.8 million euros (www. http://centralbaltic.eu/).

Project partners are: City of Helsinki, City of Tallinn, ITL Digital Lab, City of Vantaa, Estonian road administration, Forum Virium Helsinki LTD and Helsinki region transport as associated partner.

2.2 FINEST Smart Mobility Pilot 1 - West Harbour and Old City Harbour just-in-time queuing system for Heavy Good Vehicles

In September 2017, the FINEST Smart Mobility project launched a call for Pilot 1 tender. The tender was dedicated to implement the just-in-time queuing system for heavy good vehicles arriving to Helsinki West Harbour and Tallinn Old City Harbour. The system was required to deliver a timeframe via mobile phone to heavy goods drivers in which the journey to harbour area should begin. The timeframe was planned to be based on real time location, weather and traffic information. This enables the driver to adjust his/her driving speed in order to arrive just in time and unnecessary waiting in the harbours can be eliminated. Arrival of the users was required to be allocated in a way that trucks won't arrive simultaneously, allowing time for check-in before the arrival of the next truck. The system then should support sustainable mobility as waiting time can be integrated as part of the whole travel chain.

The inbound and outbound traffic in both ports is substantially more congested compared to other city regions. Annually more than 300 000 heavy good vehicles travel through the city centres. Renewing the port area means that in future years the parking spaces for heavy goods vehicles will disappear, which will make it impossible for trucks to spend unnecessary time in the port areas. The renovation of the Jätkäsaari region itself creates construction traffic and temporary traffic arrangements, which results in traffic congestion.

The Just-in-time (JIT) queuing system for Heavy Goods Vehicles (HGV) is a service platform connecting the port and ferry lines access control systems and the heavy goods vehicles driving to the port and city traffic unit. The JIT service was planned to use real time traffic data and legal requirements of the different stakeholders to route

the vehicles in the most efficient way. The JIT service therefore has good potential to reduce the negative externalities induced by heavy goods traffic in the city environment (traffic delay, pollution, noise) whilst accommodating the otherwise conflicting needs and requirements of the different stakeholders (e.g. parking lots wanted by the ferry operator but not by the municipality).

3. Summary of the activities

The general approach of the project is to adapt an already existing and successfully implemented Queue Management Service, in 4 countries and in 9 border check-points, into a new environment and for different customers. The ports of Helsinki and Tallinn have identified that an adapted Queue Management Service could answer their needs.

The GoSwift queue management service has been developed in 2011 to solve the issues of border queues at the Estonian/Russian border. Besides implementing a time slot booking service, the main innovation of the service has been to develop the concept of a virtual "electronic" queue.

The objective of this pilot was to develop a service for guiding heavy goods vehicles to the port just-in-time for them get into a specific ferry. Ideally the service should work in a way that unnecessary waiting in the harbours can be eliminated. Pilot objectives were as per the following:

- Develop an innovative queue management service for truck arrival at ports, based on virtual queueing and Just-In-Time arrival;
- Pilot and validate the operational and business viability of the service in real life conditions at the ports of Helsinki and Tallinn;
- Prepare the business exploitation of the service and its wider commercialization.

3.1 When was piloting done?

The work carried out by the project team consisted of 3 mandatory phases:

- design phase (**02.01.18-02.03.18**)
- implementation phase (**03.03.18-31.07.18**)
- undisturbed piloting and reporting phase (**01.08.18-31.01.19**).

As a deliverable from the design phase the following was expected at least:

1) Detailed description of the functionalities of the service, -> DELIVERED in following documents:
    a. Components
    b. User roles
    c. Workflow (Digi user)
    d. Workflow (No-Digi user)
    e. Use-case diagrams
    f. Journey planner
        i. Dangerous goods class
        ii. Helsinki West Harbour corridors
        iii. Principles of driving start-time calculations
        iv. Tallinn D Terminal Corridors
    g. Mobile app MOCKUPS
    h. Calculating check-in time-frame

i. Use-cases
    i. BACKEND-UC001 – Logging in/out
    ii. BACKEND-UC003 – Choosing language
    iii. BACKEND-UC006 – Managing system users
    iv. CORE-UC002 - Browsing GS app dashboard
    v. CORE-UC003 – Determining booking information (Digi-Users)
    vi. CORE-UC004 – Detecting user's current location
    vii. CORE-UC005 – Confirming vehicle's measurements and goods class
    viii. CORE-UC007 - Requesting route calculations from map and navigation service provider
    ix. CORE-UC008 - Making route and time calculations
    x. CORE-UC009 – Displaying calculations results
    xi. CORE-UC010 - Sending notifications to smartphone
    xii. CORE-UC012 - Importing bookings info
    xiii. WEBUI-UC003 – Registering vehicle and requesting calculations
j. BackEnd UI mockups
k. Possible states of vehicle in GS service
l. Notification messages

2) Technical architecture with integrations is defined, -> DELIVERED in ARCHITECTURAL OVERVIEW DOCUMENT (ADD);
3) Project implementation is clearly defined (process and testing plan), -> DELIVERED in Project Implementation Plan
4) Contracting authority has a clear idea of the functionalities of the service and tenderer's capability and competence of delivering such a service, -> ACHIEVED, by Steering Group meeting 2
5) Tenderer has an unequivocal idea of contracting authority's needs. -> ACHIEVED, by Steering Group meeting 2

As a deliverable from the implementation phase is the following was expected at least:

1) Service is installed, -> DELIVERED, https://finest.goswift.eu/web/index
2) All the functionalities of the service are ready for pilot use, -> DELIVERED
3) Service includes all the information necessary for the piloting, -> DELIVERED
4) Mandatory integrations for service piloting are in place, -> DELIVERED, by integrating Tallink Cargo bookings confirmations with GoSwift system;
5) Tests described in the detailed process plan have been implemented, -> DELIVERED, by going through the following test cases as long as there are no errors:
    a. BACKEND-TR001 - Logging in/out
    b. BACKEND-TR002 - Setting up user profile
    c. BACKEND-TR003 - Choosing language
    d. BACKEND-TR004 - Browsing departures table
    e. BACKEND-TR005 - Managing departures table
    f. BACKEND-TR006 - Managing system users
    g. BACKEND-TR007 - Managing system settings
    h. BACKEND-TR008 - Browsing vehicles list for the certain departure
    i. BACKEND-TR009 - Browsing booking/vehicle details
    j. BACKEND-TR010 - Registering vehicle and requesting route calculations instead of the driver
    k. BACKEND-TR011 - Sending (mass) notifications to drivers
    l. CORE-TR001 - Install GS app
    m. CORE-TR002 - Browsing GS app dashboard

n. CORE-TR003 - Determining booking information (Digi-Users)
o. CORE-TR004 - Detecting user's current location
p. CORE-TR005 - Confirming vehicle's measurements and goods class
q. CORE-TR006 - Browsing departure information
r. CORE-TR007 - Requesting route calculations from map and navigation service provider
s. CORE-TR008 - Making and displaying route and time calculations
t. CORE-TR009- Sending notifications to smartphone
u. CORE-TR010 - Importing bookings info
v. CORE-TR011 - Processing SMS messages from No-Digi user to determining booking information and location
w. CORE-TR012 - Sending notifications by SMS
x. WEBUI-TR001 - Browsing general information
y. WEBUI-TR002 - Registering vehicle and requesting calculations

6) Tenderer has ensured that the service meets all the quality requirements and that it fulfils terms and conditions of the contract. -> ACHIEVED, by Steering Group meeting 2.

As a deliverable from the undisturbed piloting and reporting phase is the following was expected at least:

1) Full use of the service in the actual piloting for at least 5 months, -> DELIVERED
2) Up and running 24/7 service, -> DELIVERED
3) Administration and support and immediate identification of defects and repairing of such defects, -> DELIVERED
4) Writing a pilot report in such form as in later sections described. -> DELIVERED

During the pilot many meetings were held with different stakeholders, listed below are the most important meetings that took place:

- Kick of Meeting in Tallinn, 2018 02 12
- Meeting with Tallink, 2018 02 14
- Meeting in Helsinki with Tallink Cargo, 2018 02 19
- Steering Group meeting 1, 2018 05 08
- Meeting with Tallink, 2018 08 07
- Steering Group Meeting 2, 2018 08 16
- Steering Group Meeting 3, 2018 11 19
- Meeting with Tallink, 2018 12 04

3.2 Project team

3.2.1 External team

	Primary contact	Secondary contact
City of Helsinki	Kalle Toivonen	Suvi Hänninen
City of Tallinn	Liivar Luts	
Port of Tallinn	Olari Tammel	Hele-Mai Metsal

	Primary contact	Secondary contact
Port of Helsinki	Jussi Malm	Kari Noroviita
Tallink Group	Ingvar Kupinski	Kadri Lang, Eno Saar
Eckerö	Robin Weiss	

3.2.2 Internal team

Role	Name
Project manager	Sébastien Mure
PR Manager	Madis Sassiad
Development Manager	Kristina Kallaste
Quality Assurance Manager	Kristina Kallaste
Quality Assurance Engineer	Dmitri Tsurjumov
Risk Manager	Marius Kutateladze
System Architect	Alexandr Mastsenko
Business and system analysts	Kristina Kallaste, Marko Aid
System developers	Aleksandr Mastsenko, Alexey Filippov, Madis Roosioks
App developers	Raimond Reest, Reigo Reinmets
Technical head	Roman Jermakov
System administrators	Roman Jermakov, Rain Kasemets
IT Support	Rain Kasemets, Dmitri Tsurjumov
Board	Hannes Plinte, Madis Sassiad, Marius Kutateladze, Kristina Kallaste

3.3 Realisation

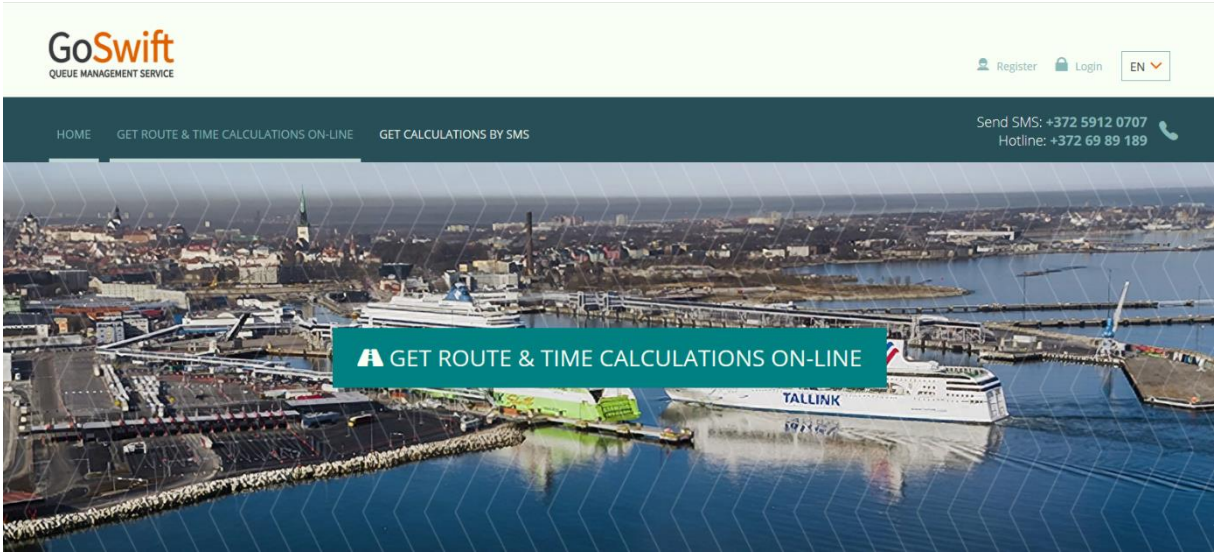
According to the project goals it was expected to realise at least the following:

MANDATORY REQUIREMENTS	REMARKS
Mandatory interface requirements	
1. Application is used with a mobile phone. Application needs to have an interface with both SMS and as a smart-phone application (App). Both Android and iPhone models need to be supported.	DELIVERED, IOS version is not delivered according to agreement with Steering Group, as previously

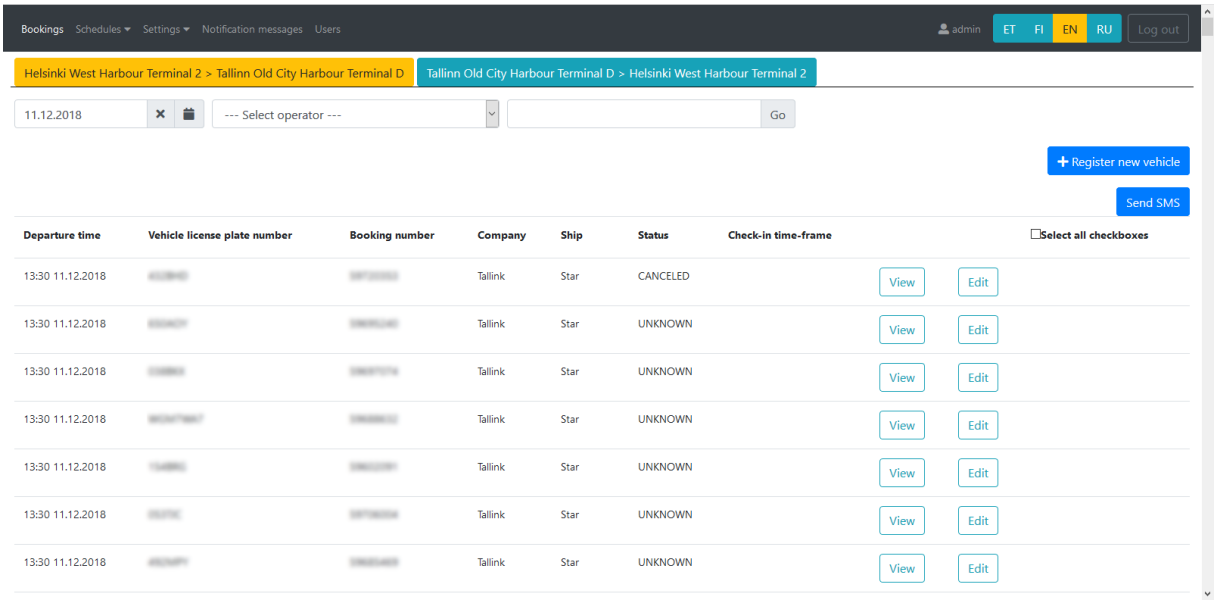
	reported, there is very low usage of iPhones by drivers.
2. User-friendly use cases need to be defined for both of the two target user groups: - Heavy-Digi Vehicle Driver - No-Digi Driver	DELIVERED – Heavy-Digi Vehicle Driver can download the app, No-Digi Driver will receive SMS text messages, if dispatcher has registered his phone number.
3. Following languages need to be supported: Estonian, Finnish and English. Adding in new languages has to be easy and cost-effective.	DELIVERED – in addition Russian language has been supported and implemented to the service
Mandatory functionalities	
4. Dispatching information is sent to the driver, prior starting the last leg towards the ports, delivered at the time of best time to start driving, with at least one warning 30 minutes before (SMS and App)	DELIVERED – the exact timeline-to-be-in-port before the ferry leaves was planned with the ports and ferry lines during the design phase.
5. Real-time information is displayed to the driver who is driving towards the ports, with: a) estimated time-to-port with current traffic, weather and speed, and b) time window and preferred time when the vehicle needs to enter the port area. The time window has to be implemented in a way that trucks won't arrive simultaneously.	DELIVERED – in the app an easy switch to Google Maps Navigator was configured with all the routing data. Time windows for arrival were split into 15 min slots, each having limited capacity to spread the volume of trucks for a longer period.
6. Registration of the driver's phone number. The drivers' mobile phone numbers are not stored in the current systems. Thus, the system will have the driver inform his/her mobile phone number that will be then linked to the registration plate/ferry ticket/reservation for further automatic updates. (SMS and App). Tenderer is responsible for ensuring that description of registry is done in proper manner and in accordance to personal data act's 10 §.	DELIVERED – during registration via app or web portal driver's phone number is required. Terms of Use has been created according to GDPR.
7. A system and framework for distribution of the application to the drivers. These could include for example print material, VMS, on-line material, or other more innovative means.	DELIVERED – Tallink check-in areas were used as the delivery point for information for the pilot drivers.
8. There needs to be explicit means and safeguards to ensure the protected and classified data from the ferry lines	DELIVERED – special agreement is signed with Tallink.
Mandatory integration requirements	
9. Information on the driver's expected drive-in time to a specific ferry. The exact details of this integration will be defined for the call for tender.	DELIVERED Check-in will be manual in the pilot
10. Road congestion information that is available with public, open APIs.	DELIVERED – all public and open APIs were studied. Still most valuable data was possible to get through Google Maps API, which was decided to be used.
11. Weather information that is available with public, open APIs	DELIVERED – all public and open APIs were studied. Still most valuable data was possible to get through Google

	Maps API, which was decided to be used.

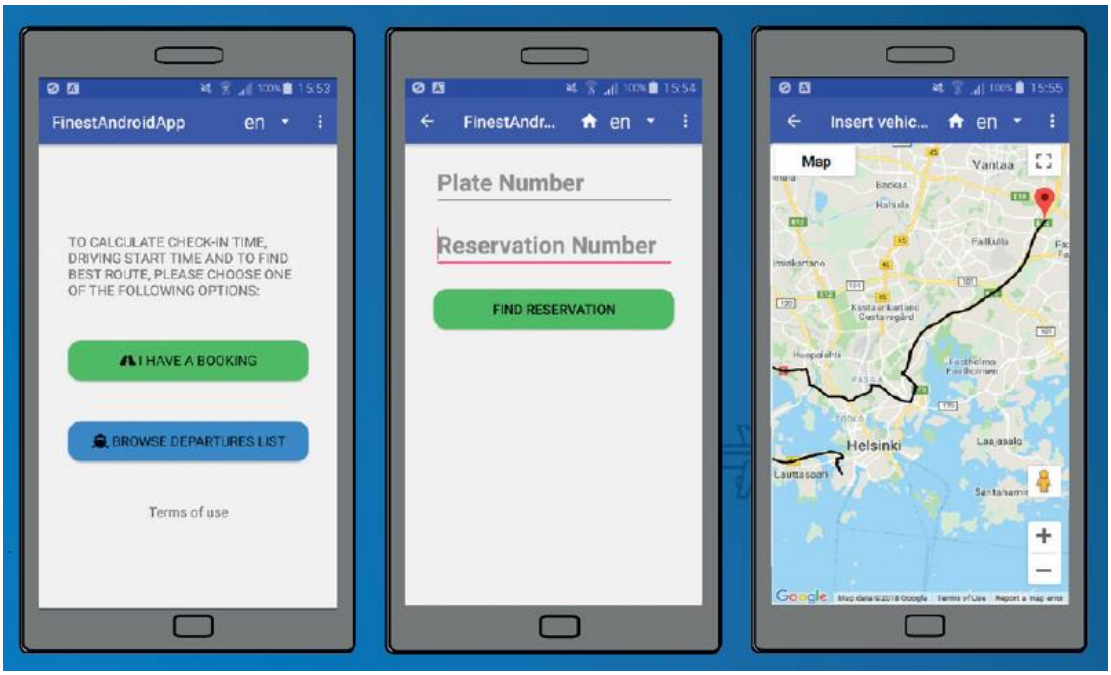
Here are some examples of realised interfaces:

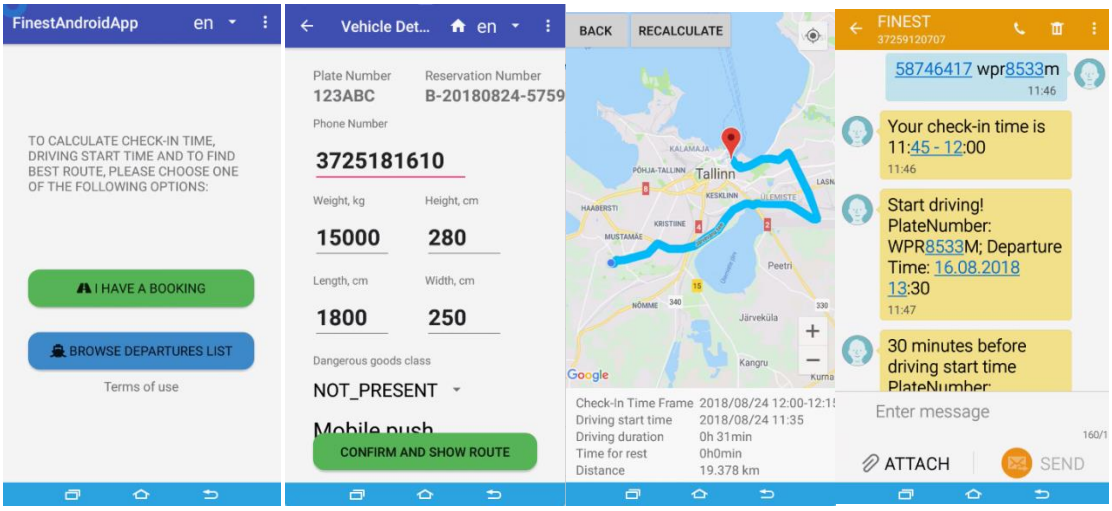


Web interface for logistics companies

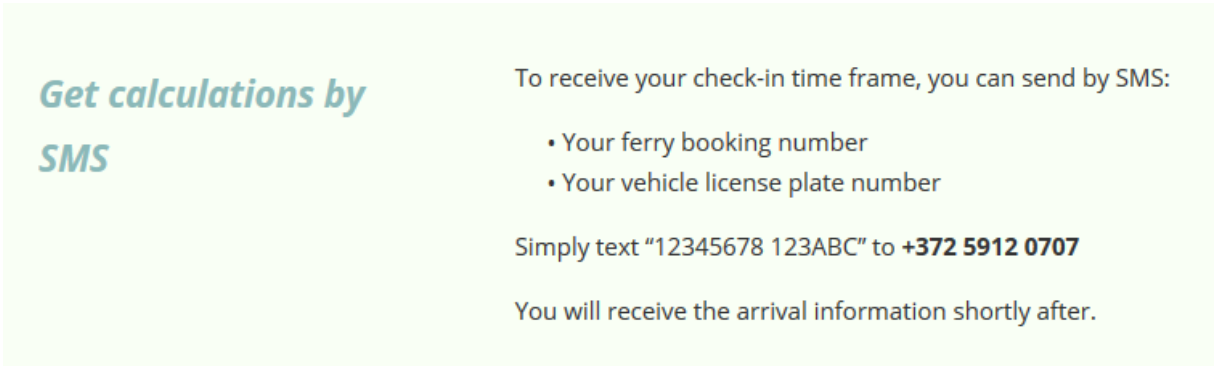


Web interface for port community partners

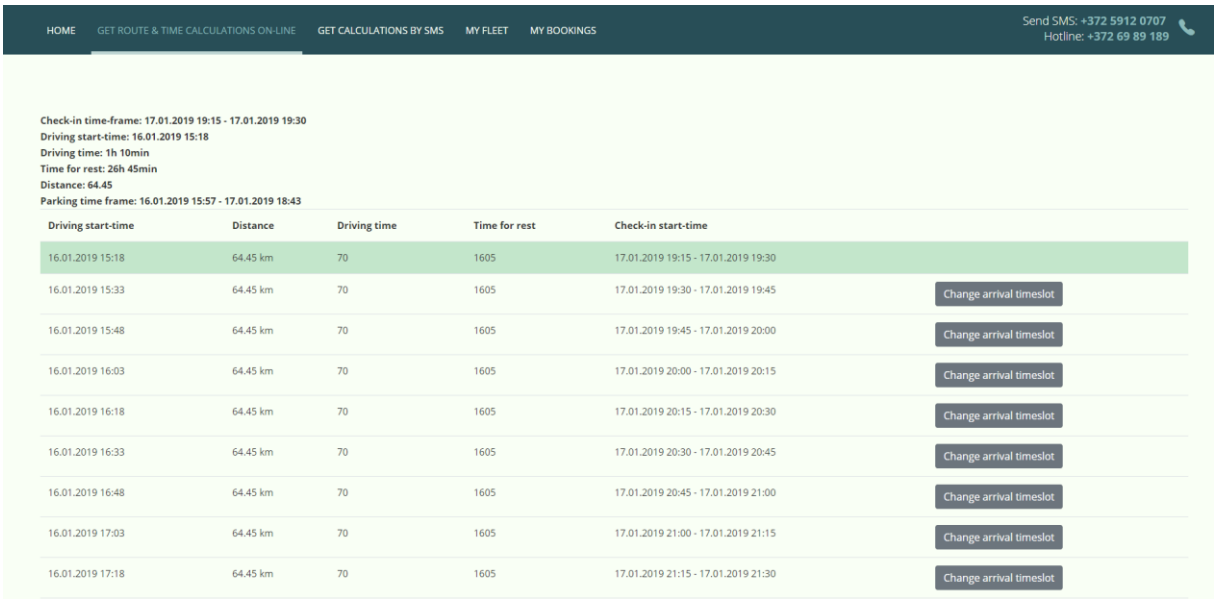




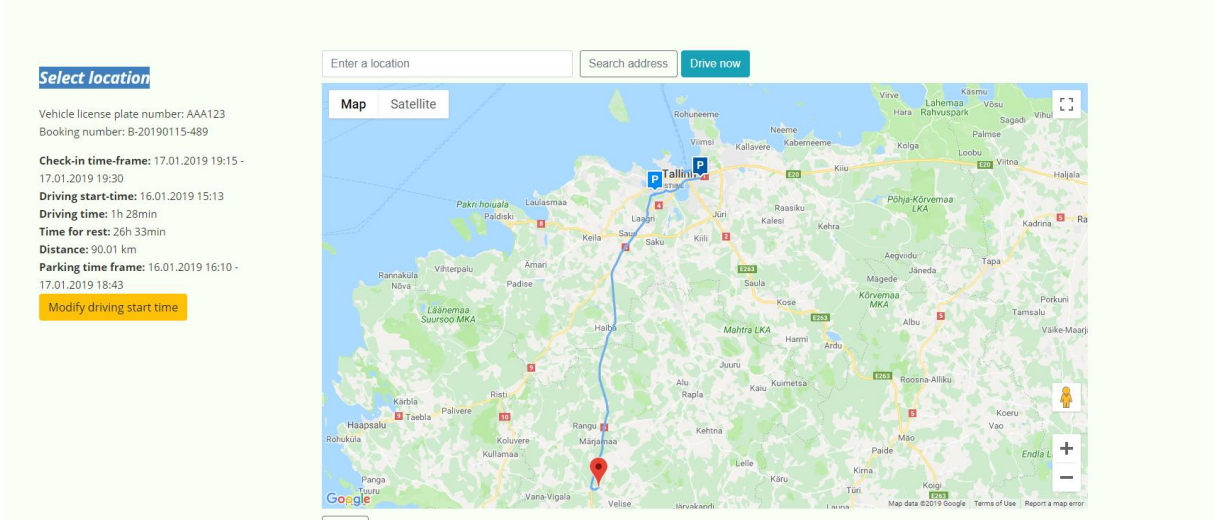
Mobile application for truck drivers



SMS service for truck drivers



Change of arrival timeslot in web portal



Adding Parking facility to the route

3.4 Cooperation with other project stakeholders

During the pilot it was actively negotiated with different stakeholders to integrate some part of the systems and find a value for future collaboration. Most critical from the pilot perspective was to achieve contracts with data owners like ferry companies and/or ports.

In order to investigate all options how and on what level the integration can be achieved GoSwift had long exchange of emails and many conference calls with the following stakeholders:

- Eckerö Line, as it was promised to be a cooperative partner by Tender documents;
- Tallink, as a major ferry company in the region;
- Port of Helsinki, as a critical infra owner in Helsinki West Harbour;
- Port of Tallinn, as a critical infra owner in Tallinn Old City Harbour.

In the first few months after negotiations started, it was clear, that there was a chance to start direct cooperation and data exchange only with Tallink and only in one direction – from Helsinki to Tallinn.

During the piloting several other companies made contact, which were contracted by the FINEST project, in order to investigate some possibilities to cooperate. The companies were as following:

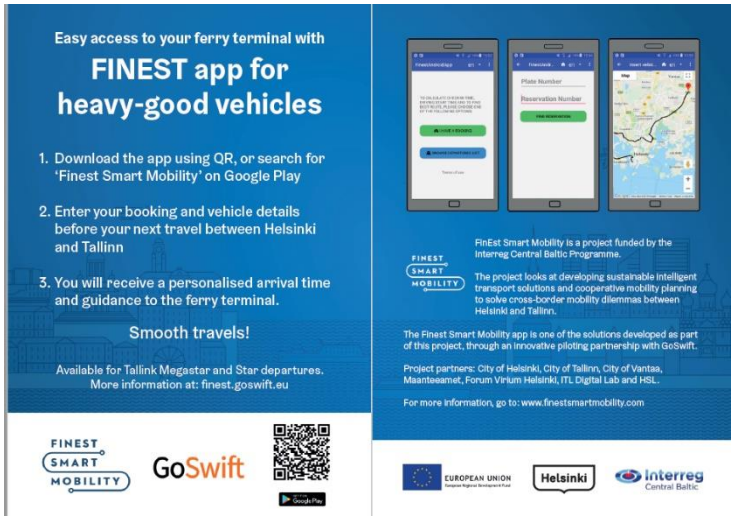
- Fleetrange, as a company providing information of real-time ferry arrivals or delays in arrivals;
- Infotripla, as a company providing on-line information of traffic congestions nearby Helsinki West Harbour area.

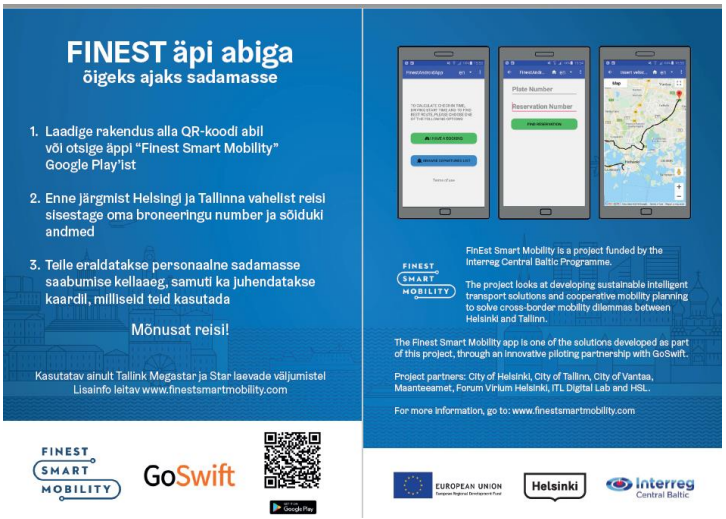
System integration with Infotripla has been found to be very interesting and valuable. Still as the exchange of information should be made in DATEX protocol and then implemented in the correct way in the GoSwift system, it requires a large number of development resources, so it was decided to start the development if Google Maps will verifiably fail in estimating travel times on departure.

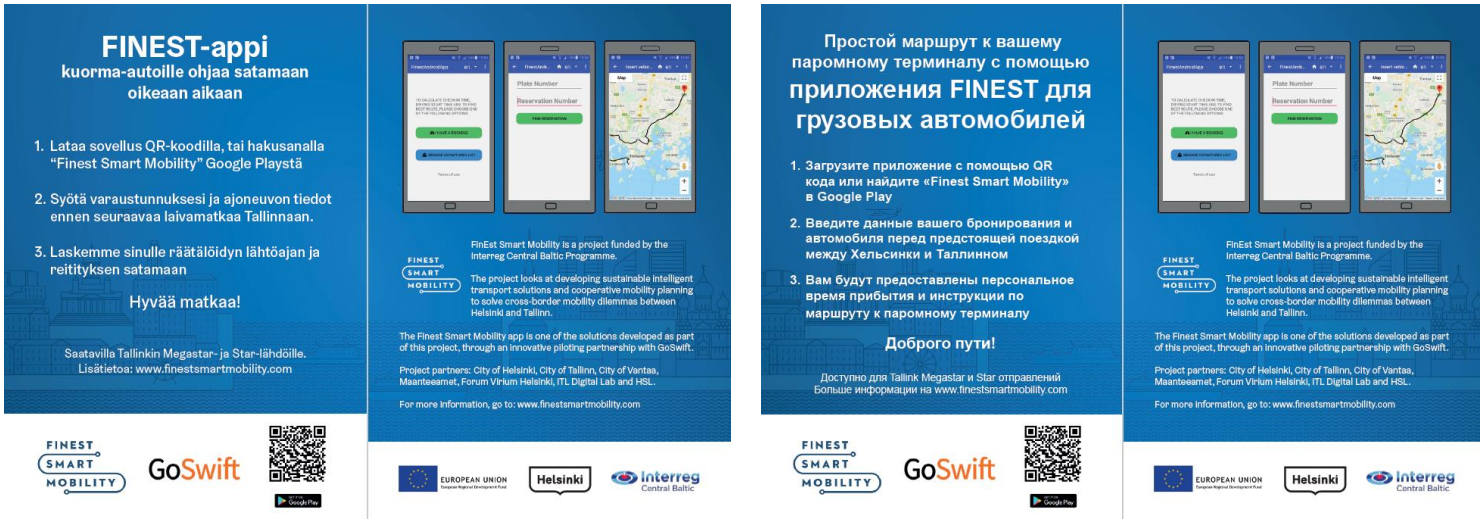
3.5 Communication material

With the help of the City of Helsinki, a pilot flyer was developed to advertise the use of the application. The flyer was A5 format, one side describing the service developed by GoSwift, the other side describing the FINEST project.

The target audience of the flyer are truck drivers using the ferry crossing between Tallinn and Helsinki. The flyer was therefore printed in 4 languages: English, Estonian, Finnish and Russian.







3.6 Demonstration and advertising at ferry terminal

Once the leaflets had been produced, GoSwift organised three staff members to meet truck drivers at the cargo check-in of the D Terminal in Tallinn. This was done in agreement with the ferry operator Tallink. This operation took place on Monday 17 December 2018, at the check-in of the 16:30 Tallink shuttle. The GoSwift team was composed of Kristina Kallaste (Development team leader), Aleksei Filippov (Mobile application developer) and Dmitri Tšurjumov (Key account and support manager). The team stayed at in the check-in to talk to the drivers during a few hours. They also interacted with the ferry operator check-in staff, to explain the service and the application. The check-in staff asked many questions about the service. During this operation, the GoSwift team met with more than 30 trucks drivers. They also deposited leaflets to be used by the drivers.

Another demonstration and advertising operation happened on Friday 04 January 2019. Madis Sassiad (Project Manager, GoSwift Sales Director) went to the cargo check-in hall to advertise the GoSwift service. The check in staff confirmed the interest of drivers for the service, and that they are using the leaflets and asking questions.

Such demonstration and advertising operation was carried out in the Tallink Cargo Check-in many times during January by Madis Sassiad and Dmitri Tšurjumov. At least 100 drivers were contacted and the new service was explained.

In addition to the leaflets it was decided to print out bigger posters which were used to advertise the service for drivers waiting in the queue for check-in service. On the posters the new service subscription process was explained in 6 languages: Russian, Estonian, Finnish, English, Polish and Czech.

4. Evaluation of the objectives and performance indicators

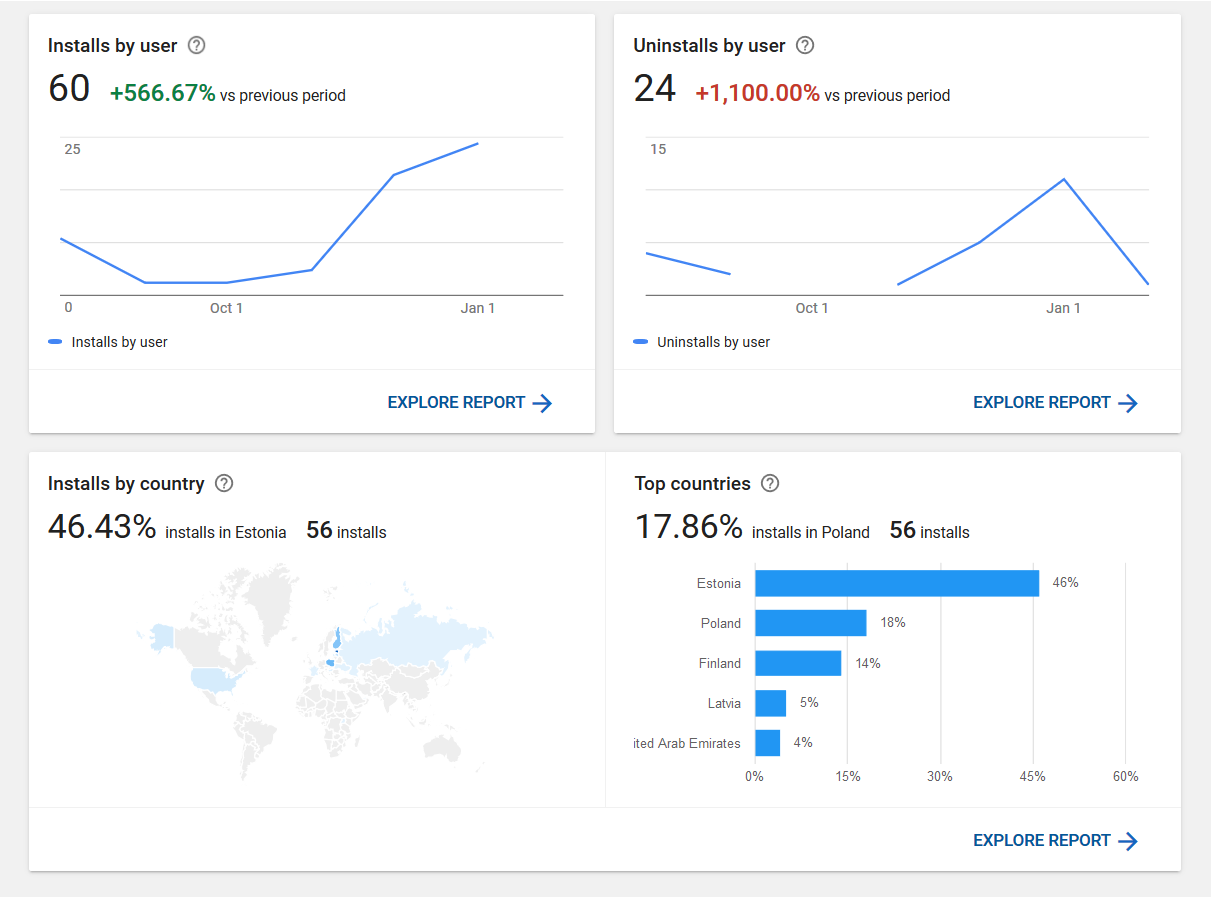
According to the Tender requirements it was said, that minimum number of pilot users is 30, but preliminary amount of pilot users is 50 drivers. After all, more than 100 usage cases were registered, more than 30 different users were identified according to the different phone numbers registered.

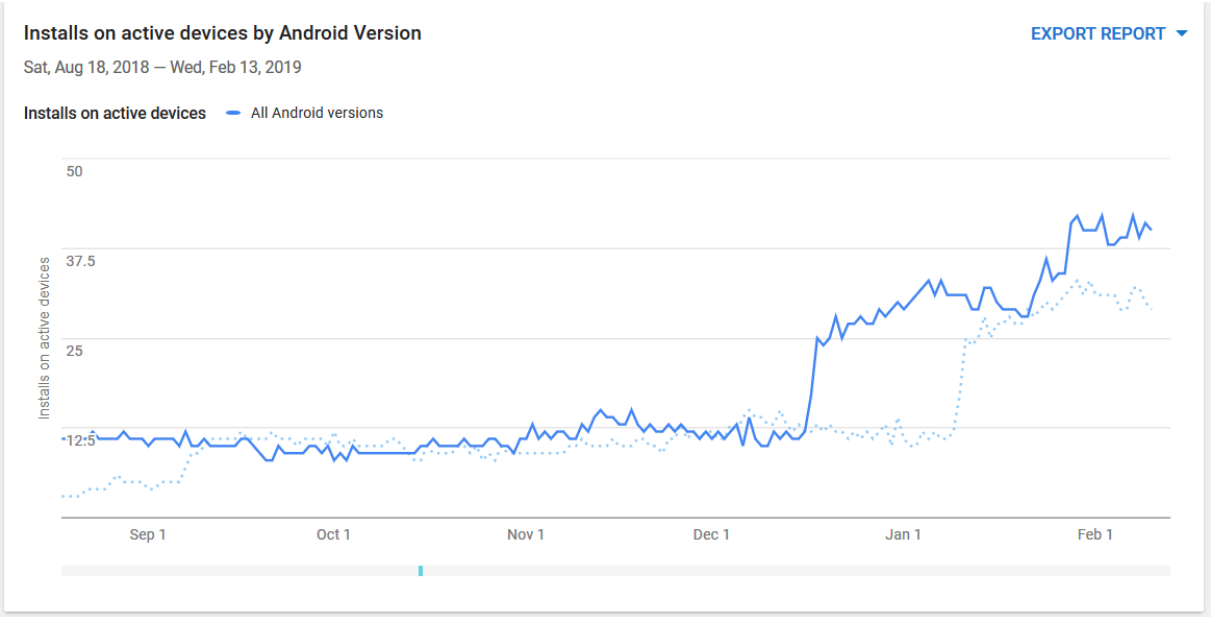
User acquirement was not easy task, as system was working properly only in Helsinki and there was very small budget for any kind of marketing campaign. GoSwift had a chance to meet with few owners of transportation companies suggested by Tallink. In addition, GoSwift contacted with all bigger transportation companies, which are using border queue management service. And in final GoSwift employees contacted directly with drivers in Tallink Check-in office to tell them about the new functionality and trained them how to start using the service.

4.1 Collecting feedback and process

Qualitative and quantitative feedback is collected from the various interactions with the test users.

Qualitative feedback includes general interest for the service, quality of the service, and evaluation of the gains from the service. An online questionnaire has been written to collect qualitative feedback. Quantitative feedback includes number of website visits, number of downloads and logs from the use of the service.





Qualitative feedback has been collected from each user – around 30. There have been drivers from Estonia, Poland, Finland, Czech, Latvia and Lithuania. Majority of drivers have used the system through the app, still some of them with help of their dispatcher. Most frequently drivers gave feedback, that they are quite aware by themselves to decide at what time they need to start driving. Changing of arriving time to the port was highly expected, as well translation to Russian and Polish language. Waiting areas should be also shown on the map.

So, some of the drivers, which are more frequent travellers and are more familiar with city environment may not have seen all the value at the first stage of using the app and therefor they have uninstalled it.

More specifically, the main information collected at the cargo check-in hall was the following:

- Advertising inside the cargo check-in is a good location, as drivers have to wait there before they are serviced by the check-in staff;
- Many of drivers declare to be aware already about the new service;
- Polish language should be considered for the continuation of the service;
- Strong interest from non-digi drivers, not only from the mobile application;
- The fact that the service is free of charge is a key selling point for the drivers.

On the technical side, feedback collected previously has been processed. According to this feedback it was decided to modify the service and develop additional features. In January a new version of the FINEST app was introduced with the following new functionalities:

- Change of arrival time – driver can easily pick a time he wants to arrive at the port, but the system still offers times, which are available;
- Parking areas can be added by administrator through Port Community interface and those parking areas will be shown in app and web portal and can be added to the journey;
- To the web portal the possibility to register the dispatchers own fleet (vehicles and drivers) has been added and to see all active and archived bookings;
- App and web portal was translated into Russian language.

These new features were highly welcomed by drivers and dispatchers.

4.2 How and to what extent pilot specific goals set out in the call for tender were met?

EXPECTED OUTCOME	SITUATION BEFORE PILOT	EXPECTED OUTCOME	REAL OUTCOME	HOW IT WAS MEASURED
Reduction of time-in-city per truck (using the solution)		Reduction of 5-10%	Some of foreign drivers (speaking Polish or Czech) were quite happy to get the knowledge of official routes inside the city. So it made them possible to follow the rules and to avoid restricted zones, which made them drive sometimes longer distance around the city (and spend longer time in the city territory), but on the other hand it made city centrum less congested.	Each "digi-driver" as he starts to use the mobile application, delivers his coordinates to the backlog, which means that it is possible easily to measure the time spent in the city area. The "non-digi-driver" has to register himself to the system in a certain place, so it is possible to mark his position at a certain time and if he arrives to the port gate it is possible to measure time between and estimate the time for driving as well time spent in the city.
Drivers to use Vesse for waiting instead of	Vesse waiting area is not fully used. There are up	90% of parking lots in Vesse are	As Tallink was able to provide only bookings from Helsinki to Tallinn. So all automatically	Pilot user questionnaire. Technical measurement from the system.

EXPECTED OUTCOME	SITUATION BEFORE PILOT	EXPECTED OUTCOME	REAL OUTCOME	HOW IT WAS MEASURED
Port Area in Tallinn	to 40 parking places in Vesse.	used by pilot users	registered usages were from one direction – from Helsinki to Tallinn. Still manually it was easy to find, that Vesse waiting area was used a lot more than before due to construction works nearby the Tallinn Old City Harbour.	Each "digi-driver" as he starts to use the mobile application, delivers his coordinates to the backlog, which means that it is possible easily to measure the time spent in Vesse waiting area. The "non-digi-driver" will register himself to the system in Vesse through the self-service terminal.
Drivers to stop parking next to or near the port in West Harbour area while waiting to enter the ferry (note: not including the area inside the port gates)	150-200 truck parking lots in temporary buffer zones. Buffer zones are diminishing with construction.	Reduction of 90% of parking (parking relates to unnecessary waiting in harbour are, not mandatory parking for check-in purposes for instance) in the harbour area (of pilot users)	All pilot users were arriving at the Helsinki West Harbour area just before their registered arrival time or later. So at least pilot users didn't park nearby the Port area.	Pilot user questionnaire. Technical measurement from the system. Each "digi-driver" as he starts to use the mobile application, delivers his coordinates to the backlog, which means that it is possible to easily see, where he has waiting for the right time to start driving. The "non-digi-driver" has to register into the system in a certain place. To collect statistics, it is planned to ask each system user in the port entrance, in which waiting area he has waited before his departure.
Increased in the use of the truck waiting areas outside the city, other than designated pilot sites (including for example gas stations and Väo and Vaarala in autumn 2018)		Increased user/driver experience of using the truck parking areas	Through the web portal and app, the information about the locations of parking places for trucks were delivered to pilot users.	Pilot user questionnaire. Each "digi-driver" as he starts to use the mobile application, delivers his coordinates to the backlog, which means that it is possible to easily see, where he has waiting for the right time to start driving. The "non-digi-driver" has to register into the system in certain place. To collect statistics, it is planned to ask each system user in port entrance, in which waiting area he has waited his departure.

4.3 What was not achieved during process

One of the biggest assumption for the success in this project was to get at least some of the ferry companies interested enough to get information, which vehicles have booking and to which ferry departure.

Unfortunately, in final there were chance to sign such a contract with Tallink only – many thanks for them for this support and very constructive cooperation.

At the beginning it was quite good initiative also from Eckerö, but no involvement in the pilot. Still doors were not closed for wider deployment in the future.

And the biggest drawback was to have the booking data of trucks only from one direction – from Helsinki to Tallinn, which means, that there was no possibility to check if the vehicle has confirmed and certified need to drive to the port and the usage of the app or system was lot more complicated as all the data required to suggest official journey by app, was needed to enter manually. So it was little showstopper if we look general picture.

5. Scalability and cross border aspects

In order to ensure that users can use the application in different environments and countries, a simple interface and usability was designed to ensure the ease of use. Due to drivers coming from many different countries and backgrounds it was essential to build in the same standard process flow in both cities, and allow for cross border aspects in the design and usability of the system, including the ease of adding languages.

In our opinion the pilot project and product would be easy to scale up and implement in ports anywhere around the World where there is a need for such a service. There are many cities suffering from traffic congestion as a result of heavy goods traffic and therefore there is a need for the product and it could be scaled easily.

Technically the system is relatively easy to scale, however the more challenging part would be to get drivers to start using the application and realise the benefits. GoSwift has been engaging with many ports around the World during the course of the project, discussing the advantages of truck appointment systems and Just-in-Time arrival systems such as this pilot project.

Having a real life product, developed during the course of this project and thanks to this project, to demonstrate to customers has been very advantageous and will help GoSwift to further develop the products and find new markets. There has been much interest in these systems to alleviate traffic congestion and we believe that this pilot can be used in various ways at many other ports.

6. Lessons learned

The system worked as envisioned and as planned, however, lessons were learnt during the project. We realised afterwards that dispatchers played an important role in the process and should have their own interface. The dispatcher's interface could include such functionality as: which trucks have a confirmed booking, which trucks need a reminder etc.

It was found that the majority of drivers that use the route regularly want to choose the latest time possible for arriving at the port. The usability of the interfaces could always be improved and drivers should receive notifications automatically (e.g. Google messaging for flight reminders) without them having to initiate the interaction with the system, this will start to get drivers to use the system more.

We found that mobility flows were affected but not significantly because the usage of the system was low due it being a voluntary service. Compared with the border queue management service which is mandatory in Estonia and ensures that there is a significant change to traffic flows and mobility. Finding ways to ensure that people use the service will ensure more change to mobility flows.

Based on our observations of the process and discussions with ferry companies, an important finding was that remote check-in at remote waiting areas would be a good way to improve the system. There is a need for a comprehensive network of inter-connected remote check-in facilities at these more remote truck waiting areas.

It was a challenge to find the resources within our company to develop the system and application. In every company there is competition for key resources and due to the budget constraints of this project, it was always difficult to secure developers' time, as there was an internal need to use developers on more profitable product developments.

Yet despite these internal challenges a lot was learnt during the course of the project and by developing the product. We can now apply our learning and improve the product even further. GoSwift has taken the strategic decision to develop products for ports and cities, to relieve traffic congestion and improve traffic flows – we see a clear business opportunity and need for such a product and are grateful for the chance to develop such a product.

7. Continuation of the service

The service will continue with the possibility to do remote check-in from more remote areas surrounding the cities. There is a risk and extra cost for ferry operators if vehicles do not arrive on time; the check-in process needs to be reversed or cancelled if there is a no-show, this in turn takes up operator's time and causes problems in the process.

It is in the interest of ferry companies to ensure that vehicles arrive on time and they need more guarantees that drivers will arrive at the port in time. This was one of the most important findings during the proof of concept and therefore one ferry company will continue the service with remote check-in from more remote areas. Additional development will be needed to include the different locations for remote check-in and to connect the locations to the service and ferry line's systems.

Both cities will need to decide which areas or regions will need to have truck waiting areas where remote check-in will be offered. Helsinki has access to a report on truck stop usage on all the major routes around Helsinki. The report includes information on how many trucks use the truck stops, what services are offered, the amount of fuel sold – this will assist the city with their decision making on which locations should offer remote check-in. Discussions should be held with ELY-keskus and the City of Vantaa/Sipoo on where the trucks parks are located.

8. Conclusions

The objectives of the Just-in Time (JIT) queuing service pilot project have been met. The service is able to guide vehicles to the port for just-in-time arrival and boarding of ferries. A reduction in unnecessary waiting in the harbours has been proven during the operation of the pilot and drivers have experienced the benefits of using such a service.

By carrying out the pilot project, GoSwift has been able to identify key learning points and validate the operational and business viability of the service in a real life, working environment. The project has enabled the development of relations between the various stakeholders and the possibility to continue the service in a viable and sustainable manner.

All mandatory requirements and goals for the various interfaces, functionalities and integrations were met throughout the various phases of the project from design, to implementation and piloting; in accordance with the FINEST Smart Mobility project.

Throughout the project lifecycle good cooperation was developed between important stakeholders, including both cities of Helsinki and Tallinn, ferry operators and transport companies (users of the service). An important finding was the need for remote check-in from remote truck waiting areas and in this regard the project will continue and realise benefits to these stakeholders. GoSwift will continue to develop the product further and engage with different ports and cities around the World.