”Technology and Service Development” is a sub report to the report “Ring road logistics – efficient use of infrastructure”

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Executive summary

High mobility and accessibility is essential to stimulate socio-economic development in regions and cities. By improving **transport efficiency with better use of existing infrastructure** negative effects on the system can be mitigated and requirements for mobility both for people and freight can be met to a higher degree. By dynamically prioritizing freight traffic in the bus lanes the possibilities to better utilize the infrastructure is explored.

The technology standard moves towards higher levels of communication solutions, which support the possibilities to make a system architecture for prioritization of freight vehicles more automated and dynamic.

The purpose of this report is to describe possible technology and service development that can be used when dynamically prioritizing freight, together with the demands on such a solution. The research question is as follows: *How could a system architecture for authorization procedures, access control and compliance, be designed based on current and future technology?*

This report has been compiled by doing interviews, performing workshops and studying reference projects.

To present the roles, functionality and requirements in a Priority Service different blocks in the system architecture and use cases have been identified.

Blocks in the suggested system architecture describe the different actors using a Priority Service, such as road authority, transport company and relevant traffic management centre/s. Furthermore use cases that describe the possible scenarios in the service have been developed. Use cases identified are:

- Manage Priority Service; the overall coordination of the Priority Service
- Application for trusted partner; for the transport company to apply to be a trusted partner and get access to the Priority Service
- Monitor traffic and capacity; to evaluate if there is satisfying conditions in traffic and level of available capacity approve priority requests
- Plan transport; where the transport company requests for priority ahead of time for planned transports
- Cancel transport; cancellations of approved requests for priority due to e.g. changes in transport assignment
- Execute transport; interaction between driver and system when executing approved transport in the priority zone
- Check transport; control and supervision from control authorities for enforcement of Priority Service
- Analyze transport; follow up on parameters connected to the Priority Service, performed both by the transport company, traffic analysts at the traffic management centre/s and road authority

The use cases can be applied when designing and developing a system architecture in a future demonstration project. When designing, planning and carrying through a demonstration a few technological choices need to be made. There are multiple solutions and multiple interests between actors and all choices favors actors differently. Recommendations are summarized in the following bullet points, it is however important to have the different possible interests in mind.

- *Focus on cellular communication rather than short range communication as this is likely the future, and no large investment costs are needed*

- *A technical solution can be built both with and without an interchange node. If it is a large or a complex system architecture with several interactions, there is an advantage in using an interchange node.*
- *Use an app in the short term for the interfaces, and look further at using API's and FMS in a larger scale implementation when the open standards are sufficiently developed*
- *During a demonstration the existing functionality of geofencing can be used, but needs to be complemented by camera based reading in order to reach the precision needed.*

When designing the system architecture of a priority system new questions affecting technology and service development arise. These questions does not necessarily need to be answered before or during a technical demonstration, but before a larger scale implementation these need to be further studied. Examples of questions to further explore are:

- For how long is the time slot in which a vehicle with an approved request can access the priority lane valid - minutes?
- What should be the criteria for accessing the prioritized lane?
- What are the responsibilities of the different actors and how should they collaborate? The authorities do not have the mandate today to solely own such a process.
- How should the Priority Service be visualized and known to other users of the traffic system?
- What should the business model look like?
    - Who will pay for the development and running of the priority system?
    - Should there be a fee for using the priority system and how should that be administrated?

Even though there are many unanswered questions there are great possibilities in technology in the near future, and upcoming tests will have to show just how far it can reach.

1. Introduction

1.1 Background

Urbanization and regional development with increasing population in the Swedish metropolitan areas are expected to result in major challenges in the traffic systems due to increase of passenger traffic, but also larger volumes of goods that are being transported. High mobility and accessibility are essential to stimulate socio-economic development in regions and cities. By improving **transport efficiency with better use of existing infrastructure** negative effects on the system can be mitigated and mobility requirements for both people and goods can be met to a higher degree. By adding freight traffic to the bus lanes we explore the possibilities to better utilize the infrastructure.

During year 2015 and 2016 the FFI-financed pre-study 'Kringfartslogistik – effektivt utnyttjande av infrastrukturen'[1] was conducted, the predecessor of the feasibility study 'Ring road logistics – efficient use of infrastructure' of which this report and work package is one part. The pre-study concluded that there is potential for more efficient use of existing infrastructure, and it could be managed by dynamically prioritizing freight vehicles on ring roads in the Swedish metropolitan areas of Stockholm and Gothenburg where congestion is high.

By giving freight vehicles priority in a bus lane during certain traffic conditions and when specified requirements are met, the traffic-flow could increase and create win-win situations with economic profits as a result.

1.2 Purpose

The purpose with this report and work package is to describe the possible technology and service development that could be used when dynamically prioritizing freight, together with the demands on such a solution. The report delivers a plan for technology in a demonstration.

Research question:

- How could a system architecture for authorization procedures, access control and compliance, be designed based on current and future technology?

1.3 Method

The pre-study contained a section regarding technology and infrastructure, and it focused a lot on the existing Motorway Control Systems (MCS). This report however has taken inspiration from three recently finished projects with relevant aims for this report as they all focus on technical solutions to

[1] Vinnova reference number 2014-06250, report available at https://closer.lindholmen.se/

improve and enable communication in new ways. The projects are NordicWay[2], Intelligent tillträdeskontroll (ITK)[3] and Autonomous Driving Aware Traffic Control[4].

Initially interviews were held with companies and authorities within the technology field. Interviewed parties are Trafikverket, Scania, Volvo, Ericsson and Technolution.

One bigger (>20 participants) and one smaller (<5 participants) workshop were held in May 2017 and February 2018 with participants from Volvo, Ericsson, CLOSER/Lindholmen, DB Schenker Consulting, Trafikverket, Stockholm Stad, Trafik Göteborg, Combitech and Scania. The purpose of the first workshop was to define requirements on a priority system, and the second workshop aimed to further develop the use cases.

Interviews were held according to table

2016-11-24	One interview	Fredrik Cederstav	Volvo
2016-12-02	One interview	Staffan Persson	Scania
2016-12-22	One Interview	Jonas Wilhelmsson	Ericsson
2018-01-30	One interview	Peyman Tavakoli	Technolution
2016/2018	Several occasions	Arne Lindeberg	Trafikverket
2017/2018	Several occasions	Anders Fagerholt	Ericsson
2017/2018	Several occasions	Andreas Höglund	Scania

1.4 Report outline

The overall feasibility study "Ring road logistics – efficient use of infrastructure" consists of seven work packages and this report regards WP5;

WP1 – Coordination of project

WP2 – Simulations

WP3 – Value of time, value of reliability and socially valuable freight

WP4 – Cost/Benefit analysis

WP5 – Technology and Service Development

WP6 – Regulations and incentives

WP7 - Demonstration

[2] Read more about the architecture, services and interoperability in the final report http://vejdirektoratet.dk/EN/roadsector/Nordicway/Documents/NordicWay_Architecture.pdf

Video of demonstration of project
https://www.youtube.com/watch?v=r7fkRbbzJRE

[3] Final report https://closer.lindholmen.se/sites/default/files/content/resource/files/slutrapport_itk-projekt.pdf

[4] https://www.drivesweden.net/Drive-Sweden-projekt/ad-aware-traffic-control

2. Results

The Original Equipment Manufacturers (OEMs) have gotten a long way in communication and the possibilities to connect vehicles are greater than ever. The standard moves towards higher levels of communication solutions, which will support the possibilities to make a system architecture for prioritization more automated and dynamic. Actors on the market have already developed similar solutions in other projects and the technology exists to develop a specific technical solution for a system architecture to dynamically prioritize freight. Automation strongly moves forward and the higher degree of automation in the priority system, the better.

The idea of prioritizing freight traffic, when requirements are met and the traffic situation allows it, is to make better use of existing infrastructure by using the available capacity in a bus lane.

To present the roles, functionality and requirements in a Priority Service different blocks in the system architecture and use cases are illustrated and described in this chapter. Some of the technology in the use cases already exists and can therefore be developed within one year, however before the jurisdiction, connection to authorities and transport company is ready perhaps three years is a more realistic time horizon for a complete system development.

2.1 Blocks in the system architecture

Fig. 1 shows the different blocks in the suggested system architecture of a Priority Service to support the idea of dynamic prioritization. A short introduction of each block is described below, and more details regarding how the blocks interact will follow in the use cases A-H, which are presented in chapter 2.2.

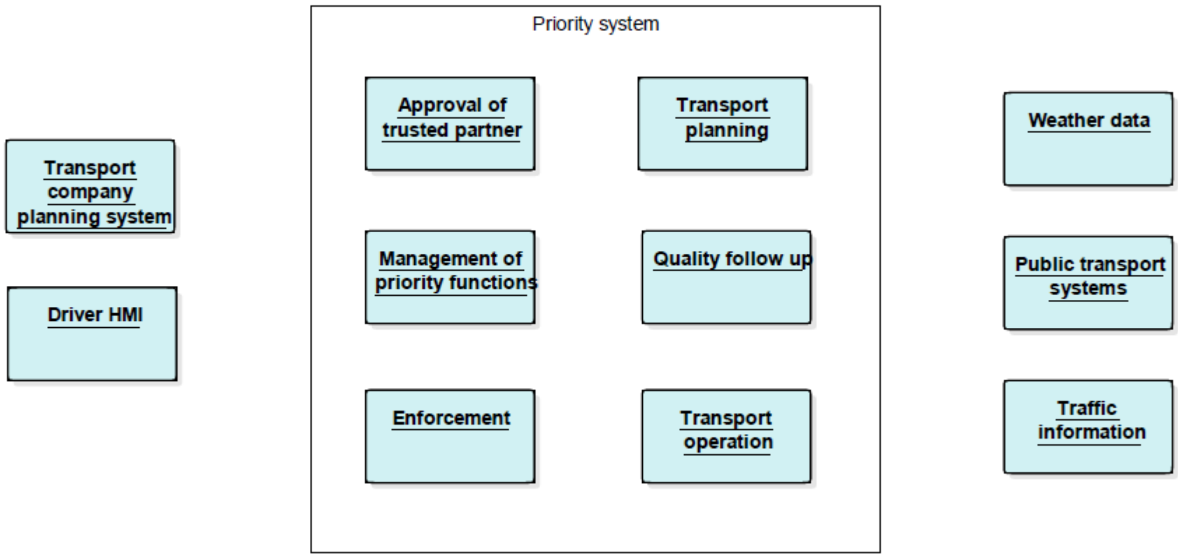


Fig. 1

The core (within square in Fig. 1) of the priority system

Approval of trusted partner is the functionality to assess the access application sent by the transport company against pre-defined criteria, in order to participate in the Priority Service. An application as trusted partner need to be approved before a request for prioritization of a specific transport mission can be handled.

Management of priority functions is the interface used by traffic management centre/s who has the overall responsibility of the daily usage of the Priority Service. The criteria which the transport companies need to fulfil in order to access the Priority Service will be handled in this block.

Enforcement contains the possibility for revisions and/or inspection from authorities. This block is important in order to ensure that the Priority Service is used as intended and that both users and non-users of the service comply with the conditions.

Transport planning is the block used for planning and requesting a time slot in the Priority Service for a specific transport mission by the transport company or driver, after gaining approval as trusted partner. Both planning a transport ahead of time, and requesting a time slot ad hoc is possible.

Quality follow up is used for quality reports and can be interfaced by several roles, both the transport company itself, analysts at the traffic management centre and possibly other authorities. It could also be used as self-assessment for the transport company or to analyze the use of the whole Priority Service.

Transport operation contains the actual execution of the transport and the options of getting access or not getting access to the priority lane.

Blocks connected to the priority system to feed and receive data

Transport company planning system is the interface the transport company uses in order to send an application to access the Priority Service, to request for a priority at a certain time slot and to follow up and analyze completed transport missions using the Priority Service. The interface/add on might be integrated in the existing planning system of the transport company.

Driver HMI (Human Machine Interface) is the interface of the Priority Service for the driver. It could be accessible via an app in a smartphone in the short term and possibly be integrated in the existing Fleet Management System (FMS) in the long term.

Weather data could be a possible source of information to connect in the architecture. Possibly the weather situation could be determined as a risk and in certain defined weather situations the priority functionality could automatically be set on pause.

Public transport systems is important to be connected to in order to have the synchronization between buses and freight transport in the priority lane.

Traffic information could be used in the same way as weather data. If disturbances in traffic, the system could on certain criteria automatically be set out of order and pause the priority functionality.

2.2 Use cases

This chapter will describe an overall background of the logical groups of functionality and use cases A-H.

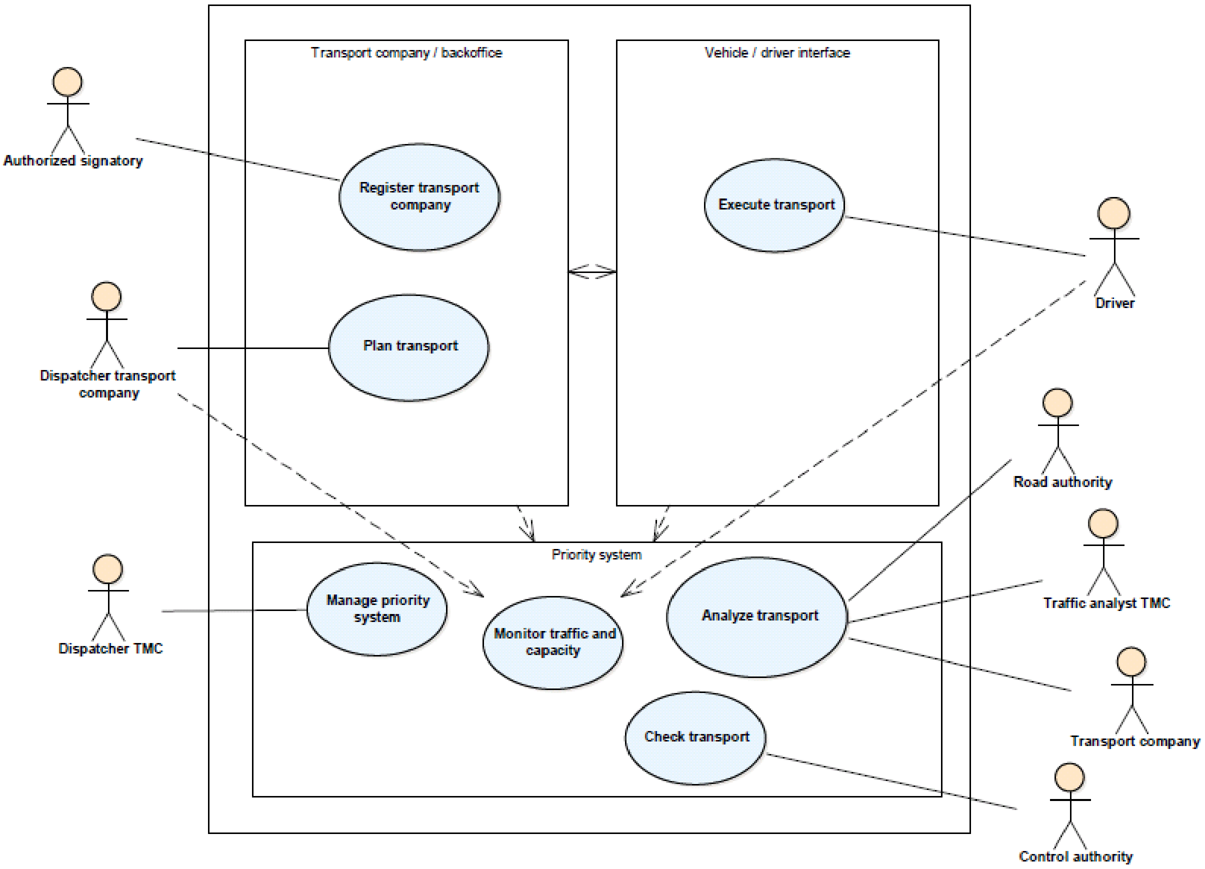


Fig. 2

Fig. 2 is an overall image of the roles and activities in the system architecture. The three boxes "Transport company/back office", "vehicle/driver interface" and "priority system" could be described as logical groups of functionality.

The box "Transport company/back office" will be the ones applying to become a trusted partner and in that way get access to the Priority Service. This is the task of the authorized signatory – which is someone at the transport company having the mandate to make such decisions. The planning of the actual transport is also done in this interface, and the responsible could be a dispatcher at the transport company. The interface used could be the transport company's own FMS, a website, connected API's, an app or another back office system.

"The vehicle/driver interface" is dedicated for the driver, and the communication could be via an app in a smartphone in the short term or through the FMS in the long term.

The box named "Priority system" is the core of the architecture where the relevant traffic management center (dispatcher TMC) adds the demands to access the priority functionality. They are also the ones having the possibility to manually run or outrun the priority functionality if disturbances in e.g. traffic. This box also has the information of capacity in the priority lane, and the driver and/or dispatcher will get the answer on their request to access based on this information.

The functionality of checking and analyzing transports is also in the "Priority system"-box. Checking transport could be of interest for control authorities in order to ensure enforcement. Analyzing transport can be of interest both for the road authority to e.g. see the overall picture of usage of priority functionality. For the transport company it could be of interest to analyze their transports to measure time gains. And for the TMC it could be interesting to see changes in traffic patterns, changes in queuing time etc.

The use cases identified are:

A – Manage Priority Service; the overall coordination of the Priority Service

B – Application for trusted partner; for the transport company to get access to the Priority Service

C – Monitor traffic and capacity; to evaluate if there is satisfying conditions in traffic and level of available capacity to let in priority requests

D – Plan transport; requests for priority ahead of time for planned transports

E – Cancel transport; cancellations of approved requests for priority due to e.g. changes in transport assignment

F – Execute transport; interaction between driver and system when executing approved transport in the priority zone

G – Check transport; control and supervision from control authorities for enforcement of Priority Service

H – Analyze transport; follow up on parameters connected to the Priority Service, performed both by the transport company, traffic analysts at the traffic management centre/s and road authority

A. Manage Priority Service

Who

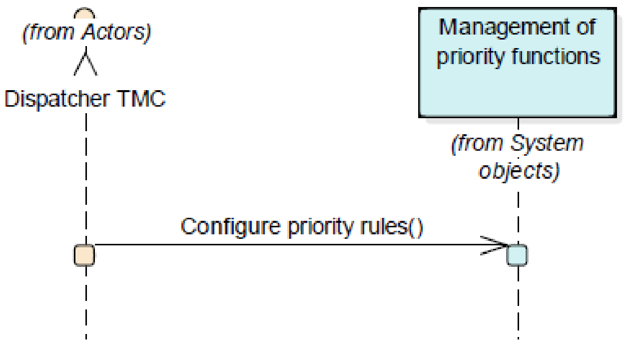
Relevant traffic management center/s are suggested as the owner of the system.

What

Configuring priority rules on transports to access the priority functionality, updates, adjustments and maintenance on system architecture need to be planned and executed. Ability to shut down/pause the system when needed, e.g. maintenance, accidents, planned roadwork.

How

The TMC dispatcher uses the interface dedicated to the relevant traffic management center in order to carry through the configuration of priority rules.



B. Application for trusted partner

Who

The Authorized signatory is responsible for registering the transport company.

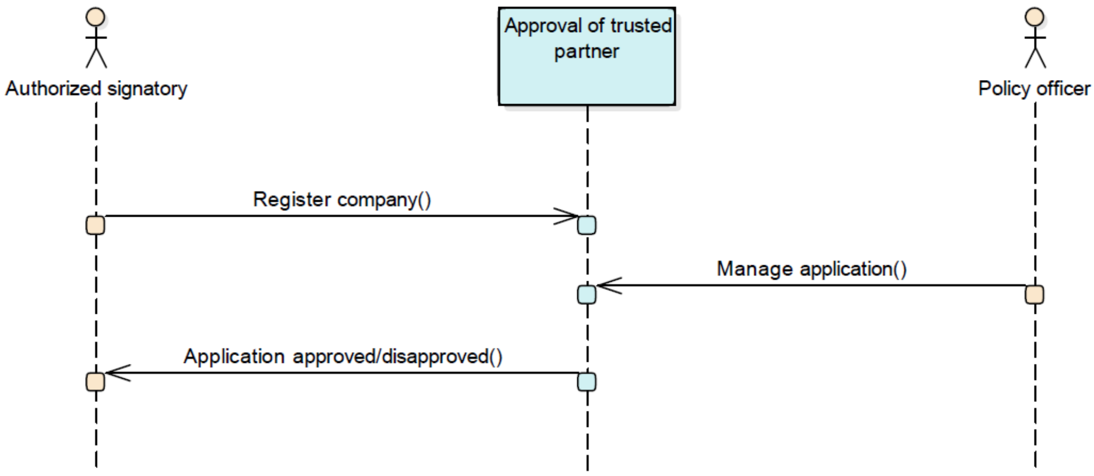
The Policy officer is responsible for approving or declining the application as trusted partner. The policy officer could be a manual process for a dedicated department at the authority or it could be an automated set up with predefined criteria, possibly a mix where a rule based evaluation is made and exceptions are handled by an administrator.

What

In order to request a slot for a transport in the priority lane an approval of application for trusted partner is needed. To be a trusted partner will make the request for priority of a specific transport easier as a lot of the needed information already is accessible through the approval of the trusted partner-application. The application is a one-time application, which is updated by the transport company when needed or renewal on a regular basis. Content in the application is general information about the transport company.

How

The authorized signatory uses the interface in order to send in application and if fulfilling requirements gain approval as a trusted partner.



C. Monitor traffic and capacity

Who

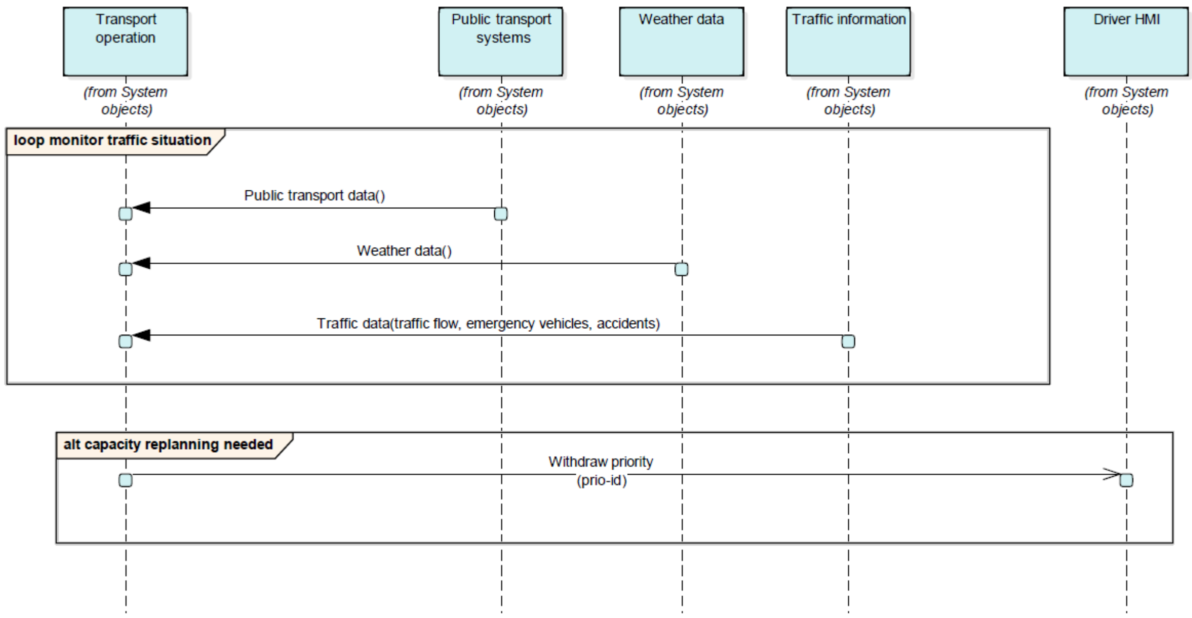
This is preferably an automated process where the system architecture gathers enough information to make the decision on its own. It could also be either a manual/partly manual process done by the TMC.

What

- The system should identify when and how much available capacity there is in the priority lane, and thereby identify how many transports can have their request approved
- The system should be able to prioritize between different transports who all have approved requests
- Should be able to re-plan if changes in capacity

How

This will be possible through communication in the system architecture with number of requests, either at a specific time slot or ad hoc, and the data from public authorities in order to predict how many requests that can be approved in the priority lane.



D. Plan transport

Who

The dispatcher at the transport company is likely the one planning the transport.

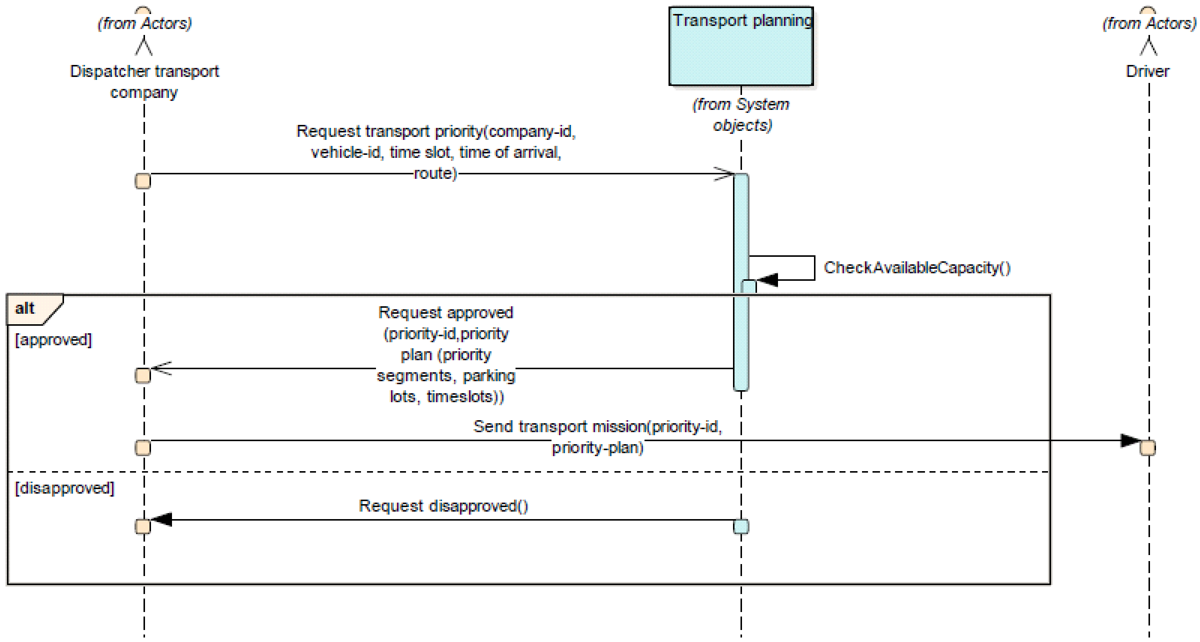
What

To gain access to the priority lane a request is sent to the transport planning module where the request is approved or disapproved.

How

The dispatcher plans the transport and requests for priority in the interface of the own FMS, adding requested information. The system checks if there is available capacity at the requested time slot. If approved a unique priority-ID is created and used to identify that specific transport. An approval on the request is sent to the dispatcher at the transport company. When it is time for the planned transport a transport mission is sent to the driver to confirm.

If a transport is disapproved information is sent to the dispatcher at the transport company.



E. Cancel transport

Who

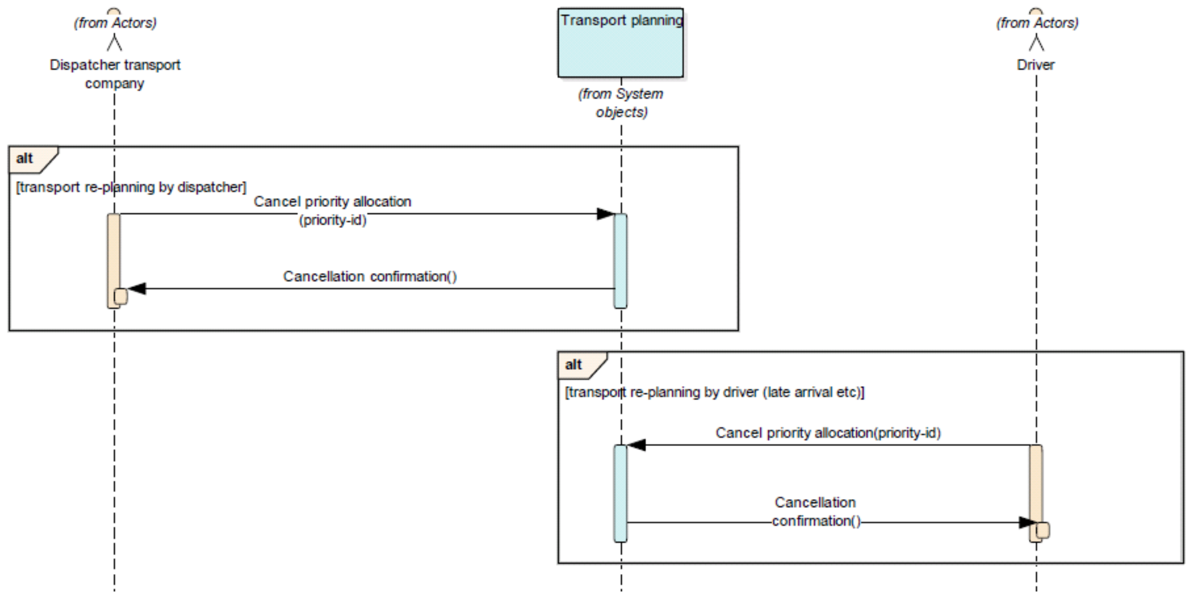
The dispatcher at the transport company or the driver are the ones cancelling the approved request for a time slot. TMCs should also be able to cancel transports due to e.g. accidents.

What

If changes occur and the approved time slot no longer is needed or possible to carry through, perhaps because of delays, re-planning, need for break, the dispatcher or driver can cancel their allocated priority.

How

The driver or dispatcher uses their interface to cancel their allocated priority.



F. Execute transport

Who

The driver is executing the transport and will have the interface to the system architecture.

What

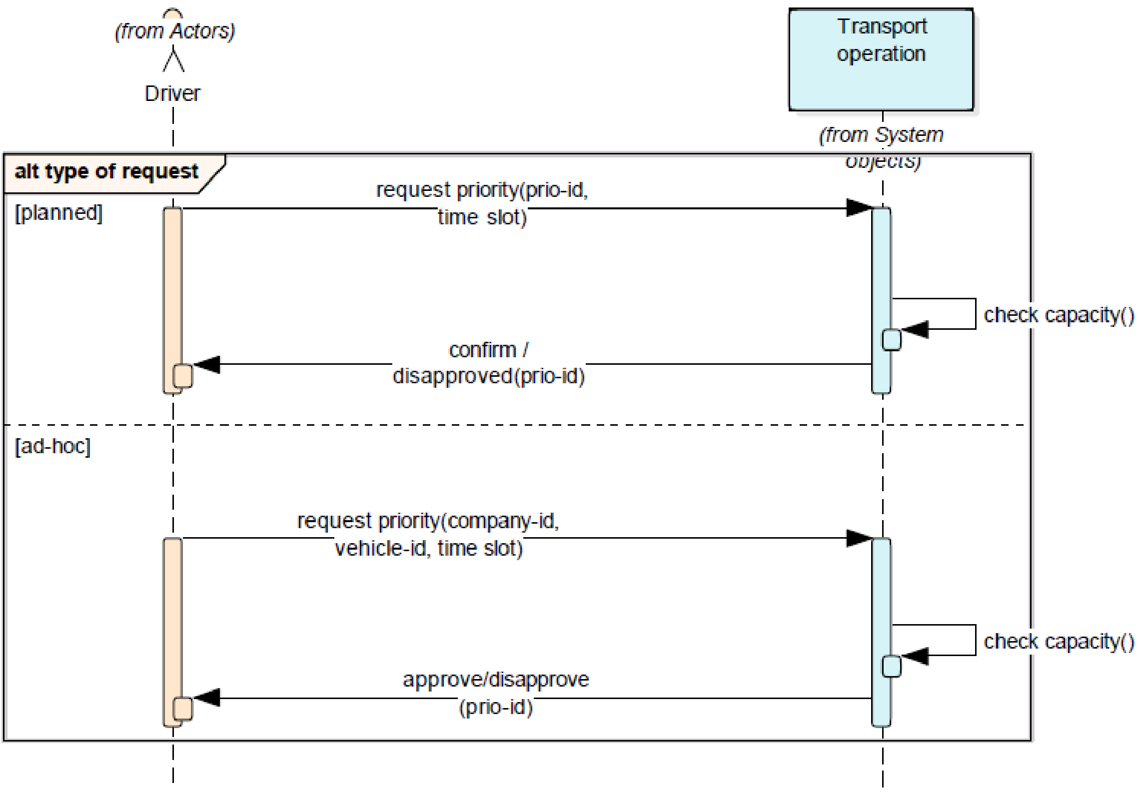
To access the priority lane a confirmation of an already planned transport or an application of approval for an ad-hoc transport is needed.

How

For planned transports the request to access at a specific time slot is already approved and the driver will be notified according to use case D. When transport is getting close to the priority area another request, with less information because of the actions already being performed in use case D, is sent by the driver and the driver awaits confirmation or disapproval depending on e.g. unpredicted traffic situation.

For ad-hoc transports more information is needed and driver awaits an approval or disapproval to access the priority lane.

In both described cases traffic safety is of greatest importance. The interface need to be user friendly and appropriate for the conditions.



G. Check transport

Who

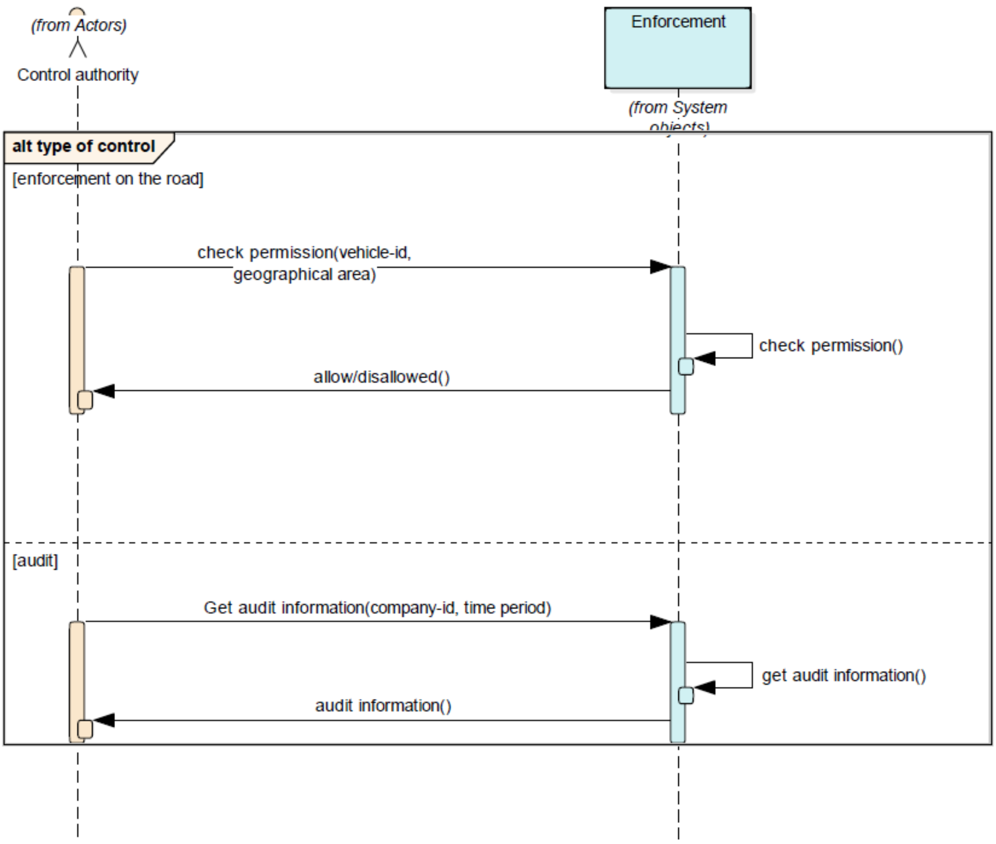
The authorities should pursue control and supervision of the processes described, as well as assign penalties for violations of the regulations.

What

A control authority could have two ways to control enforcement. One way would be road side controls to view permission to access the priority lane, and one way would be audits where information is requested.

How

Enforcement should be performed by authority, by checking permission either on the road or by audits. As development moves forward a more automated system for enforcement could be possible.



H. Analyze transport

Who

Analyzing transports is likely interesting for several parties; traffic analysts at the TMC, the transport company and the road authorities.

What

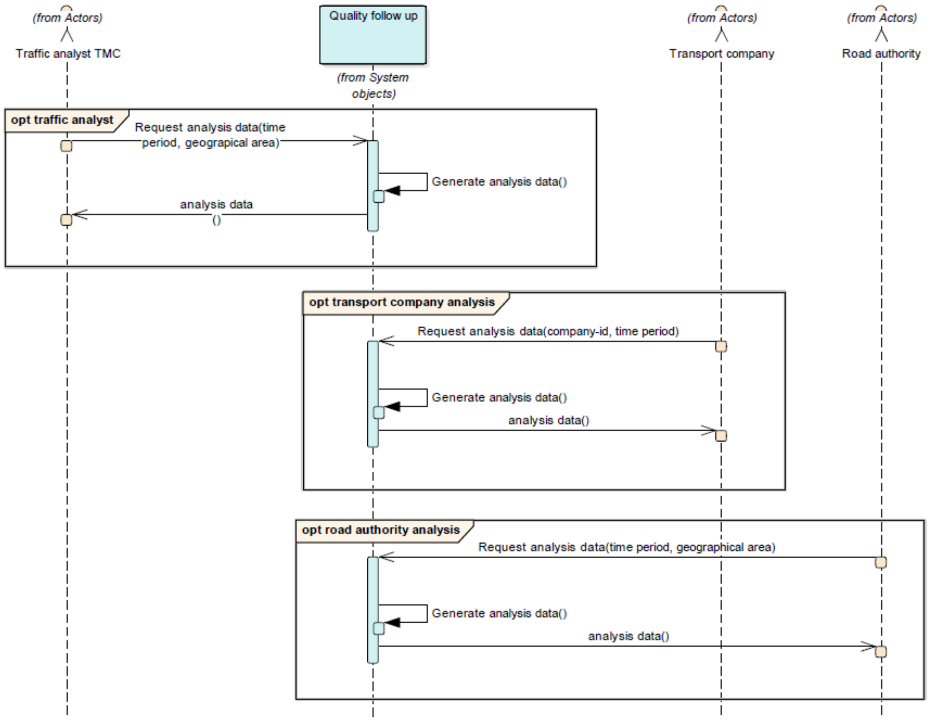
Store and visualize data in defined form, extent and time period

- To study the utility (possible time gain, average speed, number of vehicles that was granted access, number of transports that used the priority lane when given access, environmental benefits etc.)
- In order to ensure that the regulations in the Priority Service are used as agreed
- Provide a basis for planning of the maintenance of the infrastructure.
- Assess the degree of compliance

How

Defined data is stored based on need for information of the different interested parties. The data should be stored in safe manner during adequate time to minimize privacy intrusion and tampering, according to relevant law. As the General Data Protection Regulation (GDPR) will be implemented in Europe as of May 2018 it is expected that the architecture/system is built in Privacy By Design[5] from all involved parties.

[5] Built in data protection to consider the integrity regulations



2.3 Choices when designing a priority system

The previously described use cases could be used in order to demonstrate a pilot when dynamically prioritizing freight. Rapid technology development recent years have opened up for new ways to dynamically steer and optimize traffic flow and use of infrastructure. The "dynamic" part is important in order to make the best use of existing capacity. This chapter will describe existing and future technology that are enablers when designing and developing a system architecture for prioritization of freight, as well as choices that need to be made and if possible a recommendation of what option to choose.

The playfield of actors is not yet set for building a Priority Service. It is important to understand that there are multiple interests between actors and all choices favors actors differently. The recommendations of choices to make are as objective as possible, but the different interests are still important to have in mind when reading the recommendations.

The interviewed companies are very interested in developing and testing technology and services for a Priority System, and in that way influence development within this area.

2.3.1 Technical possibilities

Development is moving forward within the area of connectivity[6]. In general both busses and trucks are connected today[7]. Data about driver behavior, fuel consumption, positioning etc. is gathered. The purpose is for transport planning (fleet management-services for transport companys), information

[6] Measure of the extent to which the components (nodes) of a network are connected to one another, and the ease (speed) with which they can 'converse'

[7] https://www.scania.com/group/en/connecting-the-world/

for error search and maintenance planning. Car manufacturers together with the telecom companies can offer services such as machine driven enforcement; data from an anti-spinning system which warns other vehicles in the area for local slipperiness and applications for road assistance.

Connectivity is developing and is possible to use in different areas, which already today gives good conditions in building a Priority Service.

- Short range communication vs Cellular

Short range communication is the communication via road side units and the vehicles. Road side units are needed every 500 meters for network coverage. It is a costly investment in infrastructure and further vehicle development is needed to fully support the communication, which is not likely to be available in the near future.

Cellular communication uses the telecom network to gain coverage. No road side units are necessary. The communication is run by an electronic box (TGV=telematics gateway) which communicates via an external radio antenna. The communication from the vehicle is either via the FMS, or possibly an app.

Telecom 3G, 4G, 5G, is likely to be the future for connected vehicles. Todays obstacles with expensive license costs from the telecom companies will likely be less of problem as technology develops. It is predicted that in year 2020 5G will be available[8]. The EU Commission has launched the 5G PPP (Public Private Partnership) within the H2020 program to support the development. Highways in Europe are planned to be equipped with 5G but it is uncertain if all infrastructure will be connected to it. ITS-G5[9] in combination with 5G is likely the future within communication in the automotive industry.

Volvo states that in year 2018 a new standard for cellular communication between vehicle and system will be released. Cellular communication will be launched in the vehicles from 2019.

Vehicles, traffic lights and signs are already to a large extent connected via the telecom network today. With the future development in cellular technology it would be recommendable to use that for a development of a Priority System.

Recommendation: Focus on cellular communication rather than short range communication as this is likely the future, and no large investment costs are needed

- With or without Interchange node

An interchange node is a communication channel which knows where to collect data and transfer data to connected parties. Messages between the connected actors (TMC's, transport company, road authority etc.) are relayed through the interchange node, which distributes them to the actors, which have subscribed to the messages.

It is possible to build a Priority Service architecture both with and without an interchange node. If it is a complex solution with many connected actors there is an advantage in using an interchange node, so that all are connected to the same node, instead of all connecting to each other. If it on the other hand are few interactions the need for an interchange node is smaller. If the participating actors expects to grow in a large scale it might be an advantage to use an interchange node as it gets more complex the more actors joining the system architecture.

[8] Staffan Persson, Scania, 2016-12-02
[9] A broadcast technology based on an evolution of the wireless standard 802.11p

Recommendation: A technical solution can be built both with and without an interchange node. If it is a large or a complex system architecture with several interactions, there is an advantage in using an interchange node.

- FMS vs apps and connected API

Regarding the FMS there are standards for communication which are specific per manufacturer, OEM-proprietary, such as Volvo Dynafleet, Scaniafleet, Mercedes Fleetboard, DAF etc. as well as open standards such as ACEA (European Automobile Manufacturers' Association) where third parties can collect data to build their own services for fleet management, e.g. VECO, Trimble, Mastranaut etc.

For communication between the Priority Service system architecture to the driver the recommendation is to start by developing an application for smartphones instead of using existing FMS. Although there is an open standard (ACEA) this is not yet sufficiently developed at the moment to be flexible enough to handle the communication required within a Priority Service system. To be able to keep the system available to a broad group of OEM´s etc., it is better with an app to keep it as neutral as possible, especially in the short term. Another possible way, especially in the long term, could be to provide parties who wish to connect to the Priority Service with needed API's so different actors can connect their own systems directly to the Priority Service.

Recommendation: Use an app in the short term for the interfaces, and look further at using API's and FMS in a larger scale implementation when the open standards are sufficiently developed

- Zone Management

Zone Management which is also called geofencing could be used by the Priority Service. Zone management is when in a specific geographical area, a sensor automatically triggers some kind of action. One example of how geofencing is used is for automated speed adjustment on electrical buses on the bridge over Göta Älv in Gothenburg. On the bridge there is a transmitter sending signals to the electrified buses to lower the speed. This is automated and cannot be affected by the driver. The system has a precision on +- 2 m. There is also functions which are map and GPS-based in order to control a vehicle.

As the geofencing technology developes this could be an enabler for the technology to determine an approved area for dynamic prioritization. As a freight transport gets close to the prioritization area the geofencing functionality communicates in the priority system to confirm to the driver that their request to access the priority system is still applicable.

To use geofencing in a lane for a Priority Service system the precision need to be +-0,5m. The current GPS-signals have limitations in identifying location with that precision. This however is expected to develop, but in the meantime it can be complemented by camera based reading.

Recommendation: During a demonstration the existing functionality of geofencing can be used, but needs to be complemented by camera based reading in order to reach the precision needed.

2.3.2 Project participants needed for testing a Priority Service

In order to build and demonstrate a priority system in a demonstration project, project participants need to be selected from a range of fields. Fields are listed below complemented by examples of responsibilities.

- Software developer/s – in order to develop the functionality in the priority system

- System integrator/s – connecting the different actors and systems in the system architecture
- Cooperative Intelligent Transport System (C-ITS) expertise @ OEM – provide the team with expert knowledge regarding vehicles, FMSs etc.
- Specialist/s of communication in cloud services – provide information on designing and managing cloud solutions
- Specialist/s of communication via infrastructure – provide information on designing and managing communication solutions based on infrastructure
- Road authority – Legislation, traffic management center/s, responsibility of road usage
- Transport company/s - clarify requirements, test functionality and provide feed back

2.4 Future research questions

When designing the system architecture of a priority system new questions affecting technology and service development arise. These questions does not necessarily need to be answered before or during a technical demonstration, but before a larger scale implementation these need to be further studied.

- How long in advance can a planned transport be requested - weeks, months?
- For how long is the time slot in which a vehicle with an approved request can access the priority lane valid - minutes?
- What should be the criteria for accessing the prioritized lane?
- What are the responsibilities of the different actors and how should they collaborate? The authorities do not have the mandate today to solely own such a process.
- How should the Priority Service be visualized and known to other users of the traffic system?
- What should the business model look like?
    - Who will pay for the development and running of the priority system?
    - Should there be a fee for using the priority system and how should that be administrated?
- How to handle foreign vehicles in the priority system with regards to both access and enforcement.
- How will the General Data Protection Regulation (GDPR) regarding privacy effect the sharing of information?

Even though there are many unanswered questions there are great possibilities in technology in the near future, and upcoming tests will have to show just how far it can reach.

4. References

Workshops

2017-05	Participants from Volvo, Ericsson, CLOSER/Lindholmen, DB Schenker Consulting, Trafikverket, Stockholm Stad, Trafik Göteborg, Combitech.
2018-02	Participants from Scania, Trafikverket, Ericsson, Trafik Göteborg.

Interviews – One time

2016-11-24	Fredrik Cederstav, Volvo
2016-12-02	Staffan Persson, Scania
2016-12-22	Jonas Wilhelmsson, Ericsson
2018-01-30	Peyman Tavakoli, Technolution

Interviews – Several

2016/2018	Arne Lindeberg, Trafikverket
2017/2018	Anders Fagerholt, Scania
2017/2018	Andreas Höglund, Scania