

e-Gate & Time slotting of trucks at compounds

I. Introduction

ECG's Digitalisation Working Group (DWG) was created in 2016 after the association's General Assembly recognised the challenges and opportunities the developments of the digital age bring to the Finished Vehicle Logistics sector. Different sub-groups have been established under the DWG since then: they dealt with e-damage reports, e-gate and close-range vehicle identification. More areas have been identified as strategic topics and future project groups will focus on them. ECG has also created a joint working group with the VDA, together with VDA member and non-member OEMs to standardise interfaces and EDI messages.

The ECG DWG's e-gate sub-group started its work at the beginning of 2019 in order to develop a recommendation for IT solutions addressing a number of operational issues. The purpose was to identify the critical "need to know" information and "need to have" functionality that such solutions should provide.

Bienvenido Lozano from Grimaldi Group and Julian Moreno from Valencia Terminal Europa have been co-chairs of the group for which we would like to thank them.

It was clear from the very beginning that ECG will not choose or recommend one specific IT application or develop any market solution. The purpose is only to assess the functionality against a standard set of criteria.

II. e-Gate definition and objectives of the group

Based on the fact that there are already so many e-Gate solutions on the market the sub-group tried to define ECG's specific requirements. The sub-group has proposed a definition for what an "e-Gate" solution should look like from an LSP perspective:

"e-Gate and time slotting solution should be an independent online communication interface for LSP/OEM compounds and logistics companies for optimization of truck arrival slot distribution. It should allocate a time slot for each truck that will arrive at the compound, redistribute truck sequences in case any truck is delayed, and also notify participants about the change in the schedule. With this solution the waiting time and the length of the queue in front of the compound can be minimized; better planning on the compound can be achieved and the information flow between the truck operators and the compound operators can be made much easier."

The ideal e-Gate solution will be an open system and compatible with every single compound and/or transport management system of our member companies.

This definition only refers to time slotting at the compound but not to the unmanned gate functionality (which many actors on the market refer to as "e-Gate"). By this unmanned gate functionality, the drivers can scan their documents, thus present themselves "digitally" to the compound and obtain easy and quick information on where they should go on the compound to collect or unload their cars. This also helps them with the paperwork as a booking of a slot also entails the fulfilling of certain administrative tasks ahead of arrival.

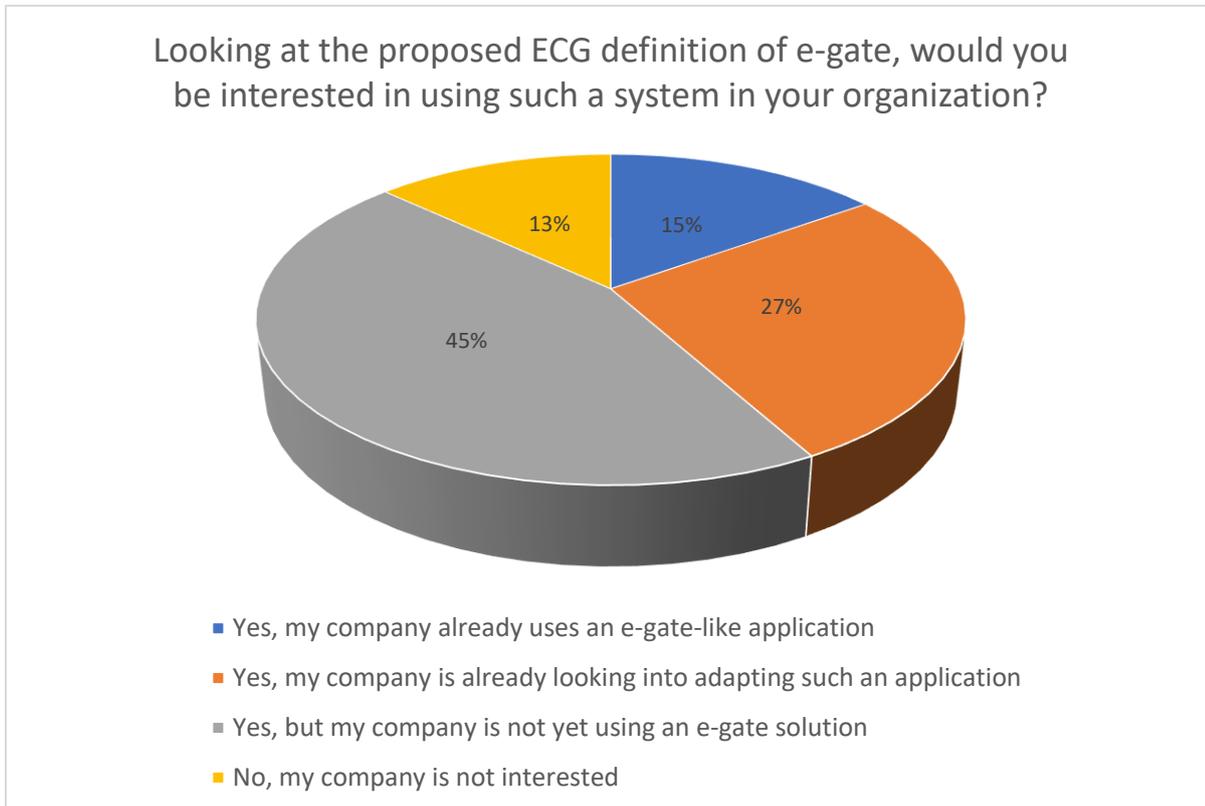
The group's first priority and main focus is on the time slotting functionality due to the sometimes dramatic queues in front of compounds. The functionality concerning unmanned/paperless compound entrance/exit, which is mentioned later can be discussed in a second phase of the project. This is why the project is called "e-Gate and time slotting".

ECG's objectives for the sub-group were:

- Promote the use of e-Gate/time slotting solutions in the industry

- Make sure that e-Gate/time-slotting system is an open and flexible solution to communicate with other systems
- Reduce waiting time/optimize truck utilisation
- Optimize processes on compounds

We used the ECG General Assembly in May 2019 to approach our membership about their e-Gate expectations and asked the following question.



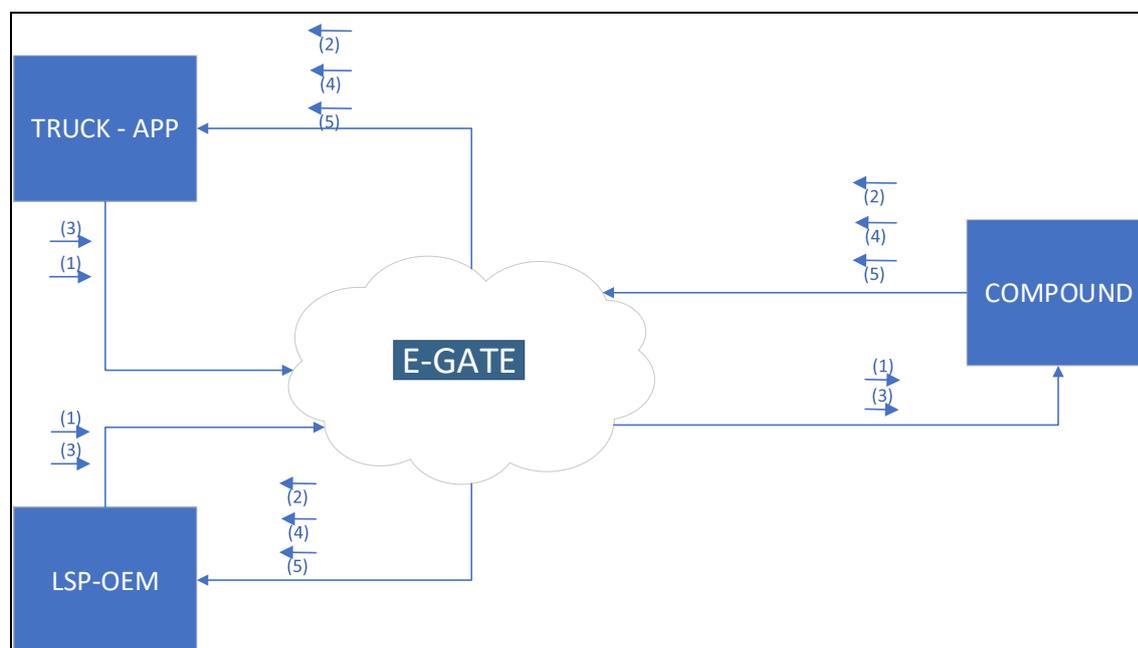
As every working group need to achieve benefits for the members, the sub-group organized a survey among the ECG member LSPs, OEMs and IT companies to know what these organisations want to obtain or would require from an e-Gate application. The results of the survey, conducted in April 2019, generated the following requirements:

- Less peaks and congestion
- Time slot management & planning of workforce
- Real time info & trucking companies get informed about their slot
- Obtaining a standard tool
- Less admin & paperwork
- Reduce truck queues
- Use of several languages
- Alert management

Besides the above, an e-Gate /time-slotting solution should also lead to improved space utilisation in the compound as less space is needed for truck parking and for preparing the cars for loading.

III. Data flow in an e-Gate solution

Based on the given facts, the sub-group proposed a data flow diagram which models how and with what kind of messages the trucking company/OEM and the compound would communicate on the slot, through an e-Gate/time-slotting app environment. This model was submitted for review and feedback to IT companies too.



The different message scenarios marked on the data flow diagram are the following:

1. Forecast to compound with information about truck, load to deliver/collect, ETA to Compound
2. Forecast Confirmation/Rejection from Compound to Forecast sender
 - a. Confirmation (Proposed Time, Ticket Number, etc.)
 - b. Rejection (Explanation of Rejection, Overstock, etc.)
3. Modification/Update of Forecast to Compound (New ETA, New licence plate, etc.)
4. Modification/Update of accepted Forecast (Delay/Overbooking, New proposed time)
5. Gate-in/Gate-out Confirmation

The planning of the slots is the main functionality of such an e-Gate application. The pre-booking of the slot is done via **message 1** in the data flow diagram, whereby the trucking LSP sends information on the future arrival of the truck as a first step.

Message 1 appears three times on the above data flow diagram: a) from truck-app to e-Gate, b) from LSP-OEM to e-Gate and c) from e-Gate to compound. Both message a) and b) are the same message from different origins, this message could be sent by the truck-app or by the LSP-OEM's own application. e-Gate is the entity that provides the gateway with the function to communicate with all entities. In case a truck-app is developed by the LSP-OEM, message 1/a and 1/b in this dataflow are the same, but if this truck-app is developed by the e-Gate software solution, they are two different messages in the dataflow.

The compound can confirm or reject a new slot to the truck (**message 2/a and 2/b**).

There are two ways of allocating a time slot for a truck.

1. The first option is that the compound shows the trucking company which slots are open and then the trucking company books the suitable one. This triggers an immediate confirmation, which is a benefit for the trucking company.

But if the trucking company books a slot this way the compound doesn't know which cars are on the truck and this is an important information for prioritisation reasons.

2. The second option is that the trucking company sends a request for a slot (by mail or EDI) and there will be a background process on how to answer to everyone who asked for a slot. For instance: all slot requests received during a day could get a confirmation in the evening. Slots can be prioritised this way and the compound knows who the customer is and which cars are on the truck.

When allocating the slot, the slot length (duration) parameter has to be taken into account as a loading operation takes less time than unloading and loading combined.

Once the slot has been booked, some deviations can occur (e.g. traffic congestion, an incident with truck, weather conditions, driver availability, police/customs inspection, etc.). The e-Gate and time-slotting application shall be linked to the truck's own on-board device with which the Estimated Time of Arrival (ETA) of the truck can be monitored on a regular basis or in real time. If the actual ETA deviates from the forecasted ETA, **message 3** is sent to the compound asking for a new slot.

A slot rescheduling can also be generated by the compound when the operations carried out at its premises take longer than expected or if any unforeseen circumstances arise. The compound would then send **message 4** to inform the trucking company.

Overall, making amendments to the slot on the day is a very important feature as statistically 40% of slots need readjustment. The recalculation of the slots is not done in the e-Gate/time-slotting application as compounds usually have their own compound management system. This recommendation proposes this as an optional field in an e-Gate/time-slotting application which would only cover the communication between the compound and the trucking company/driver on the new slot.

Furthermore, this recommendation does not cover the method used by compounds to (re)calculate the slot. The compounds might want to take into account different aspects within their management system:

- The priority of the cargo
- The customer
- The destination of the cargo
- They might give priority to trucks that unload and load at the same time, compared to trucks which only load or unload
- The length of a slot (unloading only vs. unloading and loading)
- "Shuttle service": truck makes several journeys the same day involving the compound

A new slot can only be created/proposed by the compound. It is up to the discretion of the compound when/how much after the rescheduling request of the truck it confirms a new slot to the driver, although the recommendation is that this time frame be the shortest possible for the best use of the transport equipment and the drivers' time.

It is important to note that there is no standard in the industry on what constitutes a "deviation" from a forecasted ETA: it very much depends on individual agreements. Also, the time when the deviation occurs compared to the start of the time slot is a relevant factor: e.g. deviation from the initial ETA 4 hours before it is due and only 1 hour before it is due might not be treated the same way.

The following are descriptions of the different messages and their proposed fields:

Message 1: Forecast to compound, Minimum information required

- Sender: Transport Company ID
- Receiver: Compound ID
- Action Message: New
- Operation Type: Discharge, Loading
- Truck Plate: Plate of means of transport
- Driver Name: Driver Name
- Vin Number (1...N): List of VINS included in Order Number

- ETA: Estimated time of Arrival
- Order number: Transport Reference

Message 2 (a): Forecast Acceptance from Compound, Minimum information required

- Sender: Compound ID
- Receiver: Transport Company ID
- Action Message: Acceptance
- Operation Type: Discharge, Loading
- Proposed ETA: Best arrival time to Complete Operations
- Order Number: Transport Reference
- Ticket Number: Compound Reference

Message 2 (b): Forecast Rejection from Compound, Minimum information required

- Sender: Compound ID
- Receiver: Transport Company ID
- Action Message: Rejection
- Operation Type: Discharge, Loading
- Reason: Description of rejection reason
- Order Number: Transport Reference
- New Proposed ETA: New best arrival time to complete operations.

Message 3: Forecast update/deletion to compound, Minimum information required

- Sender: Transport Company ID
- Receiver: Compound ID
- Action Message: Update, Deletion
- Operation Type: Discharge, Loading
- Truck Plate: Plate of means of transport
- Driver Name: Driver Name
- Vin Number (1...N): List of VINS included in Order Number
- ETA: Estimated time of Arrival
- Order number: Transport Reference
- Ticket Number: Compound Reference

Message 4: Acceptance Update/Cancelation from an active Ticket Number from Compound, Minimum information required

- Sender: Compound ID
- Receiver: Transport Company ID
- Action Message: Update / Cancelation
- Reason: Description of Acceptance Update/Cancelation (Delay, Overbooking, New proposed time, etc.)
- Operation Type: (Discharge, Loading)
- Proposed ETA: Best working time to Complete Operations.
- Order Number: Transport Reference
- Ticket Number: Compound Reference

Message 5: Operation Confirmation from Compound (One message per VIN), Minimum information required

- Sender: Compound ID
- Receiver: Transport Company ID
- Action Message: Operation Confirmation
- Operation Type: Gate-in / Gate-out
- Truck Plate: Plate of means of transport
- Vin Number: VIN Number
- Order Number: Transport Reference

- Ticket Number: Compound Reference

IV. Operational steps not included in the project

Monitoring is a very important operational step, however the performance indicators on the effectiveness of the operations carried out during the day are not part of this project. There are separate tools which can give statistics on the loading/unloading processes, give comparisons in relation to other periods and analyse how to improve efficiency. These solutions are out of the scope of this paper.

Another main operational step is the real gate activity. What do we mean by “gate activities”?

- Recognition of the truck: *through RFID, geofencing, OCR (Optical character recognition), by checking the paperwork etc.*
- Physical opening and closing of the gate: *manually or automatically*
- Recognition of the cargo: *automatic or manual checking of papers*
- Administration: *at a counter where compound staff check paperwork or at an e-terminal in (almost) paperless form*
- Instructions to the driver as to where they need to load/unload and where the vehicles which need to be loaded are on the terminal: *from a compound administrator or from an e-terminal*

The e-Gate/time-slotting applications could cover, optionally, these activities at the gates. However, most compounds already have a system in place to handle the arrival of the trucks and the necessary administration. Whether the gate is manned or has an automatic opening function depends on the systems used by the compound and can't be standardised.

In the ideal and most complete scenario the slotting activity and the gate activities are linked: this way the truck is recognised and matched with the attributed slot. The client and the cargo are also identified and the corresponding paperwork can be prepared or the whole process digitised.

If the gate in/gate out functionality is included in the application, the booking of a slot means that the majority of pre-administration has been carried out prior to the truck's arrival at the compound gate. Besides this, if the gate in/gate out functionality is included in the solution, the speed of the truck's acceptance at the compound can be increased. This functionality is covered by **message 5**.

The integration of gate activities to an e-Gate/time slotting application allows gates to be automated with consequent savings in staff costs.

An example of gate activities from an ECG member's compound:

- The truck receives a slot and a corresponding PIN number. (In case of a delay, either from the truck's or from the compound's side, the slot will be re-allocated and a new PIN issued.)
- The truck can enter the compound using this PIN to identify themselves
- On the screen the truck driver will be informed in which row they have to park the truck
- The same PIN number will serve for signing out from the compound

V. Conclusion

The main functionality of a time slotting application at compounds is to assure a seamless communication between the trucking LSP/driver and the compound/factory/terminal as far as truck arrival management is concerned. This includes slot allocation, communication on ETA and new slot allocation if needed as delays or rearrangements occur in 40% of cases on average¹.

In the estimation of the e-Gate sub-group, an optional functionality of such an application is the gate in/gate out process, i.e. truck identification and matching it with a slot, identification of the cargo and the client and in some cases the electronic documentation at separate terminals too. In an ideal case the communication to the truck driver about where they need to park the truck is also part of such a solution.

¹ Estimation from INFORM.

VI. Outcome of the project

The e-Gate sub-group approached several IT companies with the message specifications described in this paper and asked them to send the description of any solution they offer in this area. The purpose was to analyse them and vet them against a transparent and impartial set of criteria.

However, the only feedback received came from INFORM, a long-standing partner of ECG, and from Mosolf, a member company. On one hand, INFORM offers a very sophisticated solution which covers almost all aspects of e-Gate covered in this document. This system will be also applicable for in- and outbound logistics. On the other hand, Mosolf developed its own application which is especially made for FVL transport. This solution currently covers the basic functions but could and will be developed into a more complex product.

INFORM and Mosolf are open for everybody to share information about their e-Gate solutions. Both solutions include pros and cons, but these results altogether are not enough for the group's co-chairs to build up a clear recommendation for ECG members. Considering the above and the entire IT market in terms of e-Gate solutions we strongly believe that these requirements cannot be standardised and everybody has to make their own decision for e-Gate applications.

The group is absolutely sure that an adequate e-Gate system will reduce costs and speed up processes. The logistics sector is still under enormous cost pressure. Also taking into consideration the lack of skilled labour will lead to more and more process improvements. With the current developments in the field of digitalisation, nobody can ignore e-Gate solutions for their own organisation hence the group's recommendation that companies start searching for a necessary application that works with their existing systems.