CARGONAUT

Deliverable Market c.q. Business Challenges related to Data-exchange

Introduction

In this document we elaborate on the Business Challenges that are experience in the air cargo chain and which could be countered by improving the way actors share their data. Analyzing the needs and challenges 'in the market' is crucial because thereby it sheds light on the various incentive's actors could have to exchange their data in order to improve the air cargo chain as a whole. Thereby, this deliverable 'Market' will provide a first tool to anticipate on a future adoption of the (technical) Proof of Concept with the goal of creating a Network of Trusted Networks.

The selected business challenges came forth out of recent visit to our partner-Port Community Systems in Singapore (Cargo Community Network) and in Hong Kong (GLS Hong Kong). In Hong Kong also airline Cathay Pacific has shared their views on challenges that should be countered to optimize the air cargo chain.

Looking ahead

While this document gives a first insight into the business challenges we need to outsmart with data, we also anticipate on next steps.

Business Challenge 1: Land sided congestion

During the outbound of cargo, land sided congestion of trucks arises when cargo is delivered at a Ground handler (GHA) station.

Land sided congestion is mainly caused by 2 factors:

A) Trucks arrive unannounced at the GHA ["arrival time = unknown"]
B) Which shipments a truck contains, is unknown to the GHA until offloading; and most of the time the truck driver doesn't know either ["shipment = unknown"]

These factors create an unpredictable situation for the GHA which results in an 'ad hoc'-planning of logistics, which deprives the:

- GHA from the possibility to prepare their logistics inside the warehouse enabling a rapid flow of cargo;
- GHA from the possibility to have the incoming trucks in a logic order, related to the planned departure of the flight
- Trucking company from the possibility to 'drive in a flow' without waiting time and resulting congestion at the entrance of the GHA

Data in advance would enable the:

- GHA to prepare a dock for a specific incoming truck [when arrival time is known]
- GHA to prioritize certain trucks that are now stuck in congestion, f.e. prioritizing the trucks with shipments for flights with the earliest departure time [when shipment is known]
- GHA to create an overall planning in advance for the incoming trucks: thereby they could take control over the sequence in which trucks arrive. They could even inform the Trucking company in advance at what time trucks are expected at a certain GHA dock [when shipment is known]

- Trucking company to improve their own planning: if GHA communicates at what time they could deliver the shipments at which dock.

Experiences from International Airports with Business Challenge 1

Schiphol: experiences this challenge as it is described above

Singapore: has experienced this business challenge previously.
The local Port Community System ['Cargo Community Network'] has created a solution which addresses this business challenge to a certain extend: an E-acceptance service for 'SATS' (local GHA). This service assures that GHA receives the FWB-information of the to-be-delivered shipments in advance, which enables GHA to inform their logistical planning in advance which prepares a dock or the specific truck. Once the trucker arrives at GHA, the E-acceptance system will assign the truck to a dock based on the E-acceptance - number of the trucker, where the shipment will be offloaded immediately. This reduces waiting time for the trucks and thereby reduces the associated congestion.

Hong Kong: Experienced this specific business challenge previously and partly solved it.
For inbound Cathay Pacific (Airline + GHA) mentioned they have a so called "Consolidation delivery" which prevents congestion near the GHA. This "Consolidation delivery"-service is the direct delivery of shipments from GHA to the consignee. This service is initiated by the airline and executed by a trucking company. Whether they also have this service for outbound (meaning: consolidated pick up)
To clarify: this Consolidation-delivery-service is different from the 'Milk-run' at Schiphol, in which GHA consolidates shipments of different forwarders and delivers it at the warehouses of the forwarders, from where the forwarders will distribute the shipments further (to the consignees).

To explore further:

With Singapore:

a. Whether the E-acceptance service also enables the GHA to instruct truckers in advance, informing them at what time a truck(shipment) is welcome at a certain dock at GHA
b. Does GHA know exactly which shipments a certain truck contains? Or do they only the FWB (Freight Waybill) of the shipment and thereby on which flight the shipment should be loaded?

With Hong Kong:

Cargonaut: we are wondering whether this Consolidation delivery is solving the congestion completely; does it mean that not a single truck is pickup shipments themselves at the GHA? And do the outgoing trucks from the CD-service not cause any congestion?

Business Challenge 2: Incoming RFS trucks form a Black Box for the GHA

During the outbound of cargo, the GHA experiences a 'Black Box' for the incoming "Road Feeder Services"-trucks, which cover 'the first part of a certain flight' by road. GHA doesn't know which shipments are in these trucks, which operate on behalf of an airline, have a flight number and are called "Trucks with wings". Only during offloading, the GHA finds out which shipments a truck contains. GHA does know the flight number of the specific RFS-truck (but not in advance).

The above creates an unpredictable situation for the GHA concerning the cargo and the timing of arrival of the RFS trucks. This deprives the GHA from:

- the possibility to prepare their logistics inside the warehouse enabling a rapid flow of cargo;
- to prioritize a certain RFS truck in case of delay, related to the planned departure of the flight.

Data in advance concerning which cargo an RFS truck will deliver, would enable the GHA:

- to prepare for a specific incoming RFS truck
- to prioritize certain trucks that are line; namely: the trucks which contain cargo with the earliest flight departure time
- to create a planning in advance, taking control over the sequence in which trucks (are allowed to) arrive.

Experiences from International Airports with Business Challenge 2

Schiphol: experiences this challenge as described above

Singapore: does not experience this business challenge.
While Schiphol has many other 'hubs' within a reach of 500 kilometer (reachable by road modality) this not the case for Singapore. Therefore, the airlines at Changi Airport do not provide the RFS services.

Hong Kong: Cathay Pacific does experience this business challenge for their RFS trucks in Europe. For Cathay, this RFS challenge doesn't exist for the Hong Kong main port due to fact that Hong Kong has less connectivity by road compared to Schiphol. Therefore, Hong Kong has no RSF-services.

Business Challenge 3: Importing Forwarder is unknown to Ground Handler

For outbound from Schiphol, most of the time the importing forwarder (in the other country) is not informed that a shipment is on its way and the importing forwarder is neither informed on status-info concerning this shipment. The reason for this, is that often the exporting forwarder and the importing forwarder are not familiar with each other. Also, on the house waybill often the consignee is mentioned and not the importing forwarder.

The party that does know which importing forwarder will handle a shipment, is the consignee: therefore, the consignee should officially inform the GHA (by handing in the *station declaration*) which importing forwarder is allowed to pick up the shipment. Following this, the GHA informs the importing forwarder once the shipment has arrived at the GHA warehouse.

Experiences from International Airports with Business Challenge 3

Schiphol:
For shipments leaving Schiphol, this business challenge is prevalent in the importing country, where a solution for this business challenge is not yet in place. On the Schiphol side, Cargonaut solves this business challenge by offering GHA and importing forwarders the so called "Nomination-service".

Nomination Service summarized:

- This portal service for Ground handlers assigns a certain shipment to a certain importing forwarder
- ICS information, which is sent to Cargonaut by an airline and is stored, is used for Nomination
- Station declarations (which state who is the importing forwarder of a shipment) are sent in by Consignees (or Importing Forwarders?) and stored in a database of Cargonaut

- The "Nomination Portal" combines these 2 sources of information (as soon as these are complete) and creates a 'push-notification' informing the GHA on all relevant information related to the shipment (AWB-number; ETA of airplane; importing forwarder)

Singapore:
CCN expressed that when they receive a shipment status from f.e. KLM, CCN does not know to which importing Singaporean forwarder they need to send the status to. In the current situation, the exporting forwarder informs the consignee by 'pre-alert email'; and the consignee informs the GHA by email. On the AWB there is a free text field in which could be written *[clarify: by whom]: "*please inform importing forwarder named "XYZ" to collect the shipment".

CCN shared with us their ambition to create an app for forwarders, through which an importing forwarder automatically receives shipment status updates. CCN plans to retrieve this information from the Airlines Websites where Track & Trace information of a shipment is available by entering AWB-number. Currently a forwarder needs to actively 'request' this information at the website; whereas an app would automatically 'push' this T&T information to the relevant importing forwarder. Also, they mentioned that exporting forwarders could create a 'pre-alert' for their importing forwarders, so they are informed on the cargo which is being transported to their airport. René Kint (architect Cargonaut) responded to this by stressing that CCN would not know who to push the data to, so that problem would still exist with this app. Singapore would benefit from adopting the Nomination service that Cargonaut has developed, therefore Cargonaut will inform CCN further about the Nomination service.

Hong Kong:
This topic will be discussed in September during a skype call with GLS Hong Kong

Business Challenge 4: Increasing Demands of Shippers concerning Traceability

Shippers require forwarders (and airlines) more and more to provide insight in the location of their shipments and in qualitative data (like temperature). If the 'traditional' air cargo chain will not be able to provide in this customer need for transparency, it is possible that integrators like Uber Freight and Amazon will benefit from this unaddressed need, forming serious competition to traditional actors.

Traceability is especially lacking for shippers and forwarders during a specific part of the air cargo chain:

- Black box start: when the exporting forwarder hands over the shipment to the GHA.
- Black box end: when the shipment has arrived at the other airport and the importing forwarder has received the shipment from the GHA.
- Conclusion: there are no T&T-milestones available during the time that the shipment is at the GHA, in the air, or at Customs.

Experiences from International Airports with Business Challenge 4

Schiphol: experiences this challenge as described above

Singapore: experiences this challenge as described above; CCN has received complaints from its community about this topic.

Hong Kong: experiences this challenge as described above.
To deal with this business challenge, Cathay Pacific has set up the project "Next generation Track & Trace" with pilots in which they use sensors ('in a locker in a container') to track and trace a shipment

and to record temperature and other data. To clarify: this is done at AWB-level and also a pilot for ULD-level has been started. While shippers wish T&T at piece-level (c.q. invoice-level).

Shippers demand for Track & Trace at piece-level [2 visions how to get there]
To meet the demands of shippers to provide Track & Trace at piece-level, Cathay Pacific and Cargonaut have each a vision how to realize this.

Cathay expressed that, in order to scale up from pilot to actual operations on an international scale, it is crucial that standards will be developed [meaning: which chips to use; which network to use to transfer the data f.e. 5G, Bluetooth] and they expressed to prefer to wait with scaling up until an international standard for 'piece-level-identification' has been created. They explained that without having international standards, warehouses will not be willing to implement this functionality in their operations. Cathay Pacific has the vision that: in the future the shipper/factory will create identification through a 'chip' for each piece of cargo at box-level, whereby the airline could 'check in' the cargo and make the cargo visible for Track & Trace during the flight. Warehouses will need to install facilities to read the chips.

Cargonaut (Architect René Kint) expressed that it is not necessary to wait for standardization for 'piece-level-identification' (PLI) since a realization of T&T at piece-level, the PLI should be connected to the Shipper Identification. The actors in the air cargo chain only need to be able to identify to which Shipper Identity a shipment is related. Currently, shipment status is only available at AWB level (not at piece level). The Shipper should create an identification through 'a chip @box-level': this would enable a future connection between 'AWB and piece'.

An enabler for T&T at piece-level: Readability of available data
To fulfill the demands of shippers concerning T&T, it is important that all important documentation is 'readable at data-level' nor merely images of documents.

Cathay has so far focused on 'Digitization' of documents: by making 'images' of documents digitally available. To illustrate: Cathay has created an app for Customs where scanned documents like AWB, invoice and packing list are digitally available. However, the data within the images is not useable for other purposes than human reading.

Cargonaut stressed that if we could facilitate data-exchange 'on the level of the data' (instead of images) we could provide real solutions to shippers. For example, we could make the link between invoice and AWB, and whereby shippers could track & trace their shipments at invoice-level. At this moment (current project Cathay) the piece-level-identification is missing.

Business Challenge 5: Trend towards Belly Freight

Cargo is transported more and more inside the belly of passenger flights. This requires a different way of working for GHAs, f.e. by moving the shipments through 'dollies' to the passenger flights. Thereby it links the processes of the "passenger-side" to the processes of the "freight".

Experiences from International Airports with Business Challenge 5

Schiphol: experiences this challenge as described above.
At Schiphol Airport 60% of the cargo is transported by full freighters and 40% as belly freight.

Singapore: does not experience this as a challenge.
CCN mentions GHA are working with belly freight for many years and are very efficient in the process of combining different shipments from incoming flights and transiting these to outgoing flights.

Hong Kong: does not experience this as a challenge.
GHA are working like this for many years and have designed their processes accordingly.

Business Challenge 6: Black box at Customs Inspection: shipment selected or not?

During outbound, shippers and forwarders do not have the possibility to verify whether their shipment has been selected for physical inspection by Customs: neither at their own airport nor at the other international airport where the shipment is transported to.

This 'Black box' at Customs leads to:

- Unpredictability for the Forwarders who can not anticipate on possible delays of shipment
- Unpredictability for the Shippers who are waiting for their shipments without indication whether the flow of the shipments is steady or constrained.

Data-exchange (earlier & with all relevant actors) would help:

- Customs to determine earlier which shipments they wish to inspect physically upon arrival. They make their risk selection based on the ICS-information (Import Control System) at a Port Community Systems (like Cargonaut, CCN and GLS Hong Hong)
- Airlines since they can be informed earlier by Customs which shipments are selected. By law Customs have the 'window' to feedback this information between 4 hours before landing till only minutes before landing. Airlines are the only actors in the chain who receive a notification from Customs if/which shipments have been selected
- Airlines to inform the GHA on time through a CNI-message whether shipments are selected (at Schiphol the CNI-message is transferred to an application called ScanLog in which the GHA can see which shipments are selected)
- GHA to prepare their logistics in advance so selected shipments will be organized on time for Customs; or even have been packed together on a ULD by the exporting GHA, so Customs does not have to look for a specific (selected) package on a ULD
- Forwarders and Shippers for their logistical planning; in case of delay they would need to adjust f.e. the schedule for shipment pick-up at GHA. However, at this moment forwarders and shippers are not informed when shipments are selected by Customs for inspection.

Experiences from International Airports with Business Challenge 6

Schiphol: experiences this challenge as described above
Related to sharing data with all relevant actors (in this case: including forwarders and shippers), Cargonaut's Nomination-service could be developed further in order to inform forwarders on the status that a shipment has concerning Customs inspection.

Singapore: Experiences this challenge as described above. There is a Fastlane for security checks, for known shippers and freight forwarders (so called 'regulated agents'). The GHA performs the security checks on behalf of the airlines and will reduce the amount of checks for regulated agents. The Airport Police is in Singapore responsible for the security of cargo. This Fastlane does reduce the checks that are done by the Singaporean Customs concerning fiscality. Therefore, the mentioned business challenge is still prevalent and unsolved.

Hong Kong: Does not experience this business challenge.
They have developed a service called "Eazy Cargo". One hour before a flight arrives, Customs will assign a clearance code to incoming shipments that will *not* be selected for inspection by Customs. Through the Warehouse Platform of Cathay Pacific Cargo (= GHA) the consignee/forwarder can already see the clearance code that was assigned by Customs for a certain shipment. All agents in Hong

Kong have access to this warehouse information: by making use of the warehouse portal, the mobile app or the service "EazyCargo". In case the forwarder sees that only few shipments have a clearance code, they can conclude that most of the shipments are selected for inspection by Customs and anticipate on this 'delay' in their logistical planning.

Future scenario (mentioned by Cargonaut):
Data-exchange concerning the outcome of Custom inspections; making a step towards "Export = Import" could create a fast lane for shipments*

Practically: this would take place by having f.e. Singaporean Customs share the outcome of their Export Control at piece level, before it is loaded on the airplane to Amsterdam. In case the outcome of the Export Control could be shared even before it is packed by the GHA in Singapore, then the GHA might even organize the packing of shipments in such a way that shipments of which the Dutch customs has decided (based upon the data they received from Singaporean Customs) that these do not need to be checked in Amsterdam, are combined together on a ULD; and the shipments of which the Dutch Customs decided that these do need to be checked could also be combined on a ULD.

Added value: this would enable the Dutch customs to create both a 'fast' and 'slow' lane. Given the increasing amount of E-commerce, receiving the Export control information from other Customs organizations would enable Dutch customs to make an earlier selection of the goods to be inspected.

- For Dutch Customs: this could reduce the workload.
- For shippers: a Fastlane would speed up the delivery of shipments to the consignee. Especially for perishables this would be a valuable step, since waiting time diminishes the value of the shipment.
- For importing forwarders: if the data of the Export control would be shared, then it will be earlier known whether Dutch customs will select shipments for inspection or not. Ideally, a positive outcome of Export control will notify the forwarder that no inspection will be performed upon arrival to The Netherlands
- For all actors in the chain: exchange of Custom data could create more predictability for their operational planning

**Of course, any decision-making concerning the exchange of Custom inspection data through a future Data Corridor, would only be done/initiated by our Custom organizations. Here we only exchange ideas on the possibilities that data exchange could create for actors in the chain, such as Customs.*

Business Challenge 7: Import Declaration process is characterized by 'process-inefficiencies' like waiting time and rework

For shipments entering an international airport, a constraint which is experienced by the importing forwarder concerns the process of handing in the import declaration. Most of the time the importing forwarder takes care of the import declaration, for which he receives the required invoice information often late (when the goods have already arrived), incorrect or incomplete. In addition to the data timing and quality, the format creates also a challenge: invoice data is currently only available 'on paper' requiring the importing forwarder to 'type over' (re-entry) the invoice data for the import declaration. This manual work is more prone to errors than a digitized and automated process would be, which would be fed by invoice data 'from the source'.

Experiences from International Airports with Business Challenge 7

Schiphol: experiences this challenge as described above.
For inbound shipments into the EU there are two types of declaration:

(1) Entry in the EU. This declaration is necessary for customs to do risk assessment. For Schiphol Cargonaut facilitates airlines to do this declaration on their behalf.
(2) Import (Free circulation). This declaration is the base for import duties etcetera. This is done by the forwarder based on information he receives from the exporter or the sending forwarder.
Concerning these two types of declarations constraints in terms of waiting time and rework are experienced.

Singapore: experiences this challenge as described above and more over: CCN introduced this specific topic as a mayor business challenge.

Preclearance process by Customs: Preclearance can be realized easier if data is shared before the shipments arrive to Singapore. To be eligible for preclearance of goods Shippers and importing Forwarders have 10 days to file for Customs and pay the required tax. Forwarders get penalized in case they don't comply within the 10 days. *Note:* only general cargo or cargo from certain countries is eligible for this preclearance process. Certain kinds of cargo cannot apply for this 10-day preclearance process and always require an import permit and going through the related trade declaration process. Also transit shipments that go through Singapore require a trade declaration.

CCN service for the trade declaration process: to facilitate Shippers and Forwarder in this process of trade declarations, CCN provides a service where these actors can apply for trade permits. Thereby CCN facilitates a 'fiscal fast lane' for shipments that are imported into Singapore enabling Customs to create a preclearance for shipments.

Extra information on Singapore: Singaporean ICS process is called ACI: Advanced Cargo Information. This process also concerns the preclearance process and is used by Customs to perform risk assessments on the cargo.

Hong Kong:
This topic will be discussed in September during a skype call with GLS Hong Kong

Future scenario: 'clearing in the sky'

In case, in the future, invoice data could be shared in advance: then Customs from the importing country would have the possibility to 'clear shipments in the sky'. Thereby the process of 'release for free circulation' could be fastened. At this moment, it is only when the shipments arrive to the Forwarders warehouse, that the trade declaration is created by the importing forwarder – after they checked whether the actual shipment is congruent with the invoice data. Here also trust plays an important role: forwarders will need to be sure that they only pay tax for the shipments that they received. The lather was confirmed by forwarders within the community of Cargonaut.

Benefits from data-exchange: earlier and from the source

Sharing invoice data earlier and from the source would fasten up the trade declaration process for the importing freight forwarder since there is no delay (not waiting for emails with scanned copies of invoice information), no rework (no re-entry of data) which also reduces the risks on errors in fulfilling the trade declaration process (no discrepancies).

To explore further:

With Singapore:

- Based on our exchange we got the impression that in Singapore (during the import declaration procedure), shipments are already allowed to be picked-up by the forwarder to deliver these to the consignee, while the procedure of the import declaration is not yet completed and awaiting the payment of taxes by the importing forwarder. We need to verify with CCN whether we understood correctly.

Business Challenge 8: More strict EU regulations and enforcement from 2021

From 2021 onwards the EU introduces more strict regulations for bringing shipments into the EU. Therefore, actors in the air cargo chain are required to share data earlier and more detailed: generally speaking this requires them to make the switch from sharing data at Master-Airwaybill-level, to sharing data at House-Airwaybill-level. The regulations relate to three domains:

(1) ICS 2.0: Import Control System procedure through which airlines share their data (after which Customs determine their risk-based inspections) currently requires this data-exchange 4 hours before landing. From 2021 onwards it will be required to do this before the airplane is departing or even before it is loaded with the shipments ('pre-loading'). Also the level of detail increases: exchanging data on House-waybill level instead of Master-AWB-level, to House-way-bill-level).

(2) VAT Rules: the exemption for goods with a value below 21 euro will disappear. Therefore, also for these goods taxes need to be paid. This has implications for f.e. eCommerce-platforms like Alibaba: in the future customers will need to pay VAT when they order a product.

(3) Security: the current ACC3 regulations will become stricter from 2021 onwards. ACC3 refers to "Air Cargo or Mail Carrier operating into the Union from a Third Country Airport" which is a designation required in order for these carriers to fly cargo into or through the European Union. The new regulations start in 2021 and require that detailed information on shipments will be shared. On a practical note: this is the same level of detail as required for ICS 2.0. Therefore, the information from ICS 2.0 could be re-used for compliance with the new ACC3 regulations.

Experiences from International Airports with Business Challenge 8

Since it concerns a future development, currently there are not yet experiences to elaborate on. Merely, all actors involved with exporting shipments to the EU will need to anticipate on the stricter regulations by improving the way they exchange data: digital, in advance, complete, and in more detail.

Business challenge 9: Cross-border E-commerce market leading to big volume of smaller packages

Over the recent years, the market for E-commerce has increased tremendously: according to IATA (whitepaper 2019) cross border e-commerce is expected to account for 22% of all e-commerce This leads to a big volume of smaller packages going through the 'same' air cargo chain. This creates challenges for the handling of the E-commerce cargo, especially when documents are not yet digitized, and processes are not yet automated.

This development constitutes a business challenge which has diverse operational implications at different parts of the logistical chain. Overall it urges the logistical chain to digitize the way AWB data is exchanged. In the words of our partner GLS Hong Kong: Data: *"it is impossible for the GHA and*

Forwarders to process the increasing volume in packages in the old-fashioned way (non-digitized). There is an urgent need for new ways of data exchange, especially with our Customs organizations".

Schiphol: does experience the business challenge as described above

Singapore: does not experience this business challenge as such, since Changi Airport is mainly a *transit* for eCommerce between China and Australia.

Hong Kong: does experience the business challenge as described above

GLS HK illustrated the needs for the digital exchange of data by using the following example:
More e-commerce more data needs to be shipped at the same ULD. The average size of a door-to-door shipment (house level) is decreasing since it contains e-commerce packages which are smaller. Whereas typically a master would contain 2 to 4 house shipments, eCommerce may lead to a Master AWB with 4000-6000 house waybill data. The exchange of this data can no longer be done with paper documents.

To explore further:

- Besides the challenge of high volumes of data, also the high number of physical packages creates logistical challenges which (according to GLS HK) lead to extra processing costs in the air cargo chain. This topic will be explored further.