

# Cover Page IAPH Environmental Award

## Entry Title: "Virtual Depot"

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The Virtual Depot project was started within the smartPORT initiative of the Hamburg Port Authority in order to reduce the environmental footprint of the port, particularly looking at air pollution (SOx, NOx, soot and CO2) caused by unnecessary truck trips to and from the empty container depots. Modern IT applications were introduced to link those containers which were just emptied in the empty container depots - and which would normally go to the empties storage - to those containers which are required within the same time period to be loaded for export purposes. Thus avoiding the trip to and from the empty containers depots in the port.

The application is adaptive to modern communication gadgets as tablets, smart phones, lap-top computers and regular pc work stations and thus can be used anywhere with ease by all stakeholders which have to take part in the process.

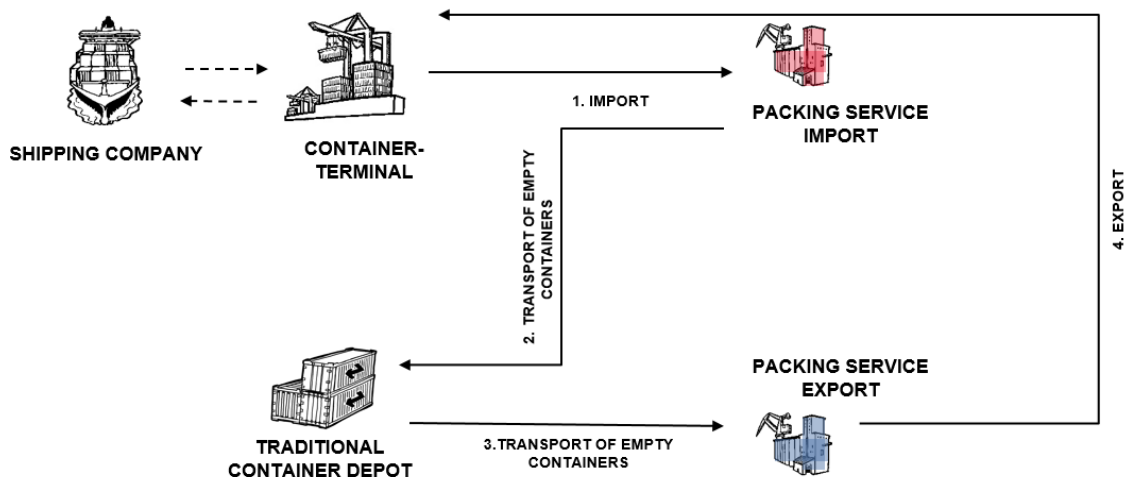
The Virtual Depot does not only improve the air quality, it also helps to reduce traffic jams and decreases the wear and tear of roads and bridges in the port.

# The Virtual Depot Project Description

## 1 The current Status of Empty Container Logistics

Empty container transport processes between the packing services providers, container depots and container terminals in the Port of Hamburg lack co-ordination. There is no direct communication between the parties because the container fleet logistics is managed by liner shipping companies and hauliers. Moreover, the parties involved in the transport process often do not have direct contractual relationships. The liner shipping company as the owner of the containers is originally responsible for stuffing and unstuffing the containers. In most cases the liner shipping company engages a haulier to handle the empty boxes and to purchase the packing services from respective providers. After the full container has been unstuffed at the packing services provider (import), it is transported to an empty container depot. Often, this same container is later sent from the empty container depot back to the same packing services provider for stuffing (export) and subsequent sea transport. The period of time between the delivery of the empty box to and its collection from the depot varies and is usually short. The many packing services providers in the port, which are often located far away from the container terminals, are the physical interfaces for the container stuffing and unstuffing orders placed by the shipping companies and hauliers. The parties to the transport process are scattered throughout the port and surrounding area, and the many truck trips over, in part, long distances produce high emissions and put great strain on the transport infrastructure in the port.

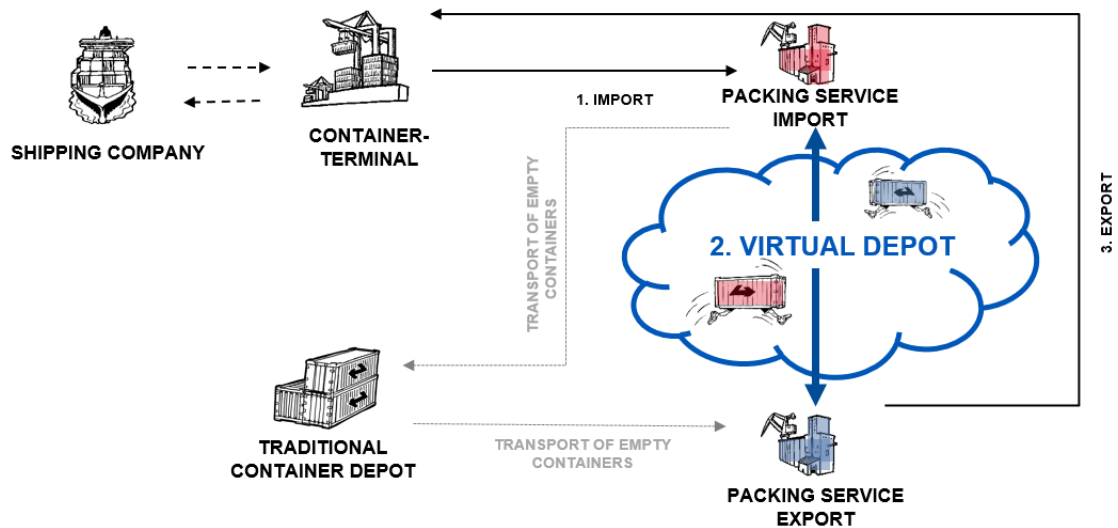
Many Empties pass through the Port - serious Impact on the Environment



## 2 Why the Project was initiated

Trucks are a major cause of air pollution in the city. Empty truck trips and empty container movements, often made due to a lack of co-ordination of container logistics processes, account for roughly 30% of truck traffic in the port area. Apart from generating emissions, they also contribute to congestion and shorten the lifespan of the Port of Hamburg's infrastructure. Thanks to "smart technologies" the process chain can be synchronised and many truck trips saved, which benefits the environment and infrastructure as well as improves traffic flows. In view of the above the HPA, Hamburg's politicians and the Association of Container Packing Services Providers [Fachverband der Containerpackbetriebe] initiated the Virtual Depot project.

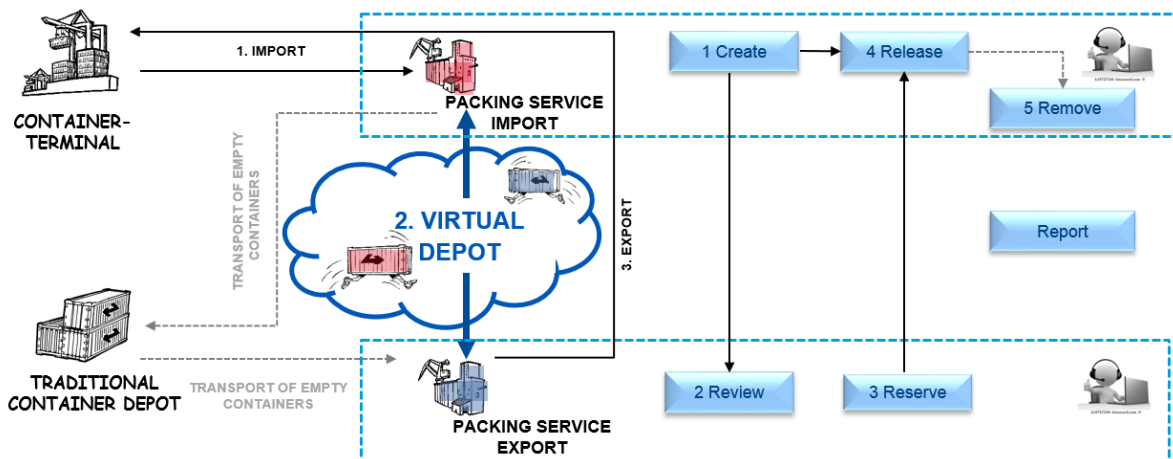
The Virtual Depot speeds up Business Processes, saves Energy and Time, and cuts Emissions



## 3 Implementing the Software

The computer-based system enables the packing services providers, hauliers and shipping companies to co-ordinate their processes to avoid unnecessary empty container trips to and from the empty container depot. This will make empty container logistics processes more efficient, save time and cut costs. The IT application offers a platform that lists empty import containers available at participating packing services providers, which are meant to be sent back to a depot, which however could be used by another participating packing services provider for export purposes. These empty containers will then be blocked in the system (i.e. no transportation to the empty container depot). The party managing the container (shipping company) that has to agree to the change in use (export), will be informed.

## Create - Review - Reserve - Release - Remove - Report



The IT application is cloud-based to avoid having to install servers and operate a computing centre, etc. The system was developed based on the responsive design method, i.e. it automatically adjusts to the resolution and orientation of the mobile end device (smartphone, tablet, computer browser) used. The containers made available for the change in use (now export) are added to a list provided on the IT application.

## Container Requests at a Glance

IBM | Hamburg Port Authority    Start   Empty Containers   Create Container   Container Requests   Create Request   Contact Details   Shipowner Contact

**Container Requests**

Search

Carrier	Quantity	Type	Delivery from	Delivery until	Export	Status	
open						approved	
open	COSCO	5	4N86	05.09.2016	07.09.2016	Patrick's Packbetrieb Testaccount	requested
open	IBM-Reeder Test Account	9	4N96	30.08.2016	02.09.2016	Oliver Weissshuhn	requested
open	IBM-Reeder Test Account	7	4N86	23.08.2016	26.08.2016	Patrick's Packbetrieb Testaccount	approved
open	IBM-Reeder Test Account	7	4N86	23.08.2016	26.08.2016	Oliver Weissshuhn	accepted
open	Patrick's Reeder Testaccount	1	2N86	23.08.2016	30.08.2016	IBM Packbetrieb Account	approved
open	Patrick's Reeder Testaccount	1	2N86	23.08.2016	30.08.2016	Patrick's Packbetrieb Testaccount	accepted
open	IBM-Reeder Test Account	8	4N86	23.08.2016	10.09.2016	IBM Packbetrieb Account	requested
open	IBM-Reeder Test Account	8	4N86	23.08.2016	10.09.2016	Oliver Weissshuhn	offered

## 4 Potential for cutting Emissions

In theory, the IT application will save up to 100,000 truck trips a year in the Port of Hamburg. With the virtual depot in place CO<sub>2</sub> emissions in the Hanseatic City of Hamburg will decrease by roughly 1,680 tonnes, NO<sub>x</sub> emissions by 7 tonnes and PM by 0.11 tonnes. The more parties participate in the project, the higher the cut in emissions. And finally, the virtual depot also makes economic sense and has high socio-economic benefits.

## 5 What Partners hope to achieve with the Project

The partners participating in the Virtual Depot project each benefit in their own way. The public authority - the Free and Hanseatic City of Hamburg - and the Hamburg Port Authority will enjoy socio-economic benefits and in particular (1) ecological benefits as (2) truck traffic volumes and/or container transports in the Port of Hamburg will decrease and (3) the strain on the transport infrastructure will ease.

Packing services providers will benefit from (1) less truck traffic, (2) lower transport costs and (3) faster access to containers.

Shipping companies / hauliers will benefit from (1) lower empty container depot charges and (2) lower transport (carrier haulage) costs. Even the container depots will benefit from the Virtual Depot project. Though the number of containers processed will decrease, the operational efficiency will increase as traffic will be more evenly spread and peaks at the gates reduced.

Almost 90% of all liner shipping companies serving Hamburg and 20% of the packing services providers that are members of the association take part in the project. The number of participating packing services providers is expected to rise significantly in future years.

### Participating Shipping Companies and Packing Services Providers



## 6 Project Status

The pilot phase and the evaluation phase (8 March – 8 December 2016.) were completed as planned. The IT system has met all functional and processing requirements. The participating companies exchanged about 840 empty containers in the virtual depot, which saved roughly 1,500 truck trips in the Port of Hamburg. This is equivalent to a reduction in CO<sub>2</sub> emissions of about 11 tonnes, 0.05 tonnes of NO<sub>x</sub> emissions and 0.0005 tonnes of PM.

714 transactions (as of 12 December 2016) took place between import and export within one company (“own turnaround”), which is equivalent to 85%. The biggest winners are the environment (emission reductions) and the transport infrastructure in the Port of Hamburg (less strain) as truck round trips to and from the depots become unnecessary.