

“THE TRANSPORTIC PROJECT”. THE MOBILITY SOLUTION APPLIED TO CONTAINERS TRANSPORT IN BARCELONA PORT.

The Port of Barcelona (PB) has been carrying out a process of continuous improvement of the document flows and information exchange related with goods transport and logistics for more than 15 years. Thanks to this endeavor, PB has been able to substitute inefficient paper documents and manual information exchange for Electronic Document Interchange (EDI) in real-time at most of the processes. Nowadays PB is in a position to affirm that more than 90 % of communication related to container traffic is performed electronically. Those EDI services are implemented by Portic, the Port Community System of the Barcelona Port.

In 2005 a system based on mobile technology was designed in order to achieve a reduction of the number of kilometers ran by trucks without load. The basic idea was to send the transport order directly to the truck from the Haulage Company’s office. The system was tested using various prototypes and running pilot studies with a limited number of trucks until satisfactory performance of the technology was achieved. The final release went live in 2008 and was rolled out with the commercial name of “TRANSPORTIC”. From that moment, TRANSPORTIC became one of the services that are implemented and commercialized by PORTIC, and since it’s official launch, it has been installed in 400 trucks, with approximate transaction volume of around 6.000 transport orders/month (representing 10 % of the total container land transportation traffic).

The Solution

The TRANSPORTIC system is built up by the following the parts:

- The Haulage Company should either have an ERP or use Portic’s web application, capable of creating electronic assignments of transport orders to truck drivers based on the “IFTMIN” EDIFACT message.
- Each truck driver connected to the system is handed a PDA, equipped with Windows Mobile 5.0 or 6.0, adding GPRS, GPS and a mobile 4 inch printer with blue tooth. The software designed for the PDA was thought for being used by drivers so simplicity was one of the major concerns during the design phase.
- PORTIC has a Message Broker that translates and transacts the IFTMIN messages in different formats (EDIFACT, XML, and FLAT FILE) and communicates to the Mobile Communication Service.
- The Mobile Communication Service is in charge of interchanging messages between the platform with the PDA. The Messages interchanged between the platform and PDA are the following.
 - Platform to PDA.
 - Truck’s order. The description of the service of the truck. Starting location, warehouse, dates, conditions, etc.
 - Alerts & Messages. The platform can send alarms to PDA like “Service Cancelled by the Contractor” etc.
 - PDA to Platform

- Order Confirmation. The PDA and the driver confirm and accept the truck's order.
 - Arrival and Departure at Point of Interest. The driver signals the arrival or departure at Port, Client's warehouse, etc.
 - Incidents. The driver can indicate trouble alerts during service execution, like "Traffic Jam", "Breakdown".
 - Information. The driver can send important information for the transport service like container number, seal number.
 - Signed Delivery note. The person in charge of the reception of the container could sign in the PDA and then delivery note is printed out and a copy is sent to the Haulage Company.
 - GPS Position. The location of the truck is sent by the PDA thanks to the GPS feature.
- Web Page to follow up and track the services with GOOGLE MAPS integration.

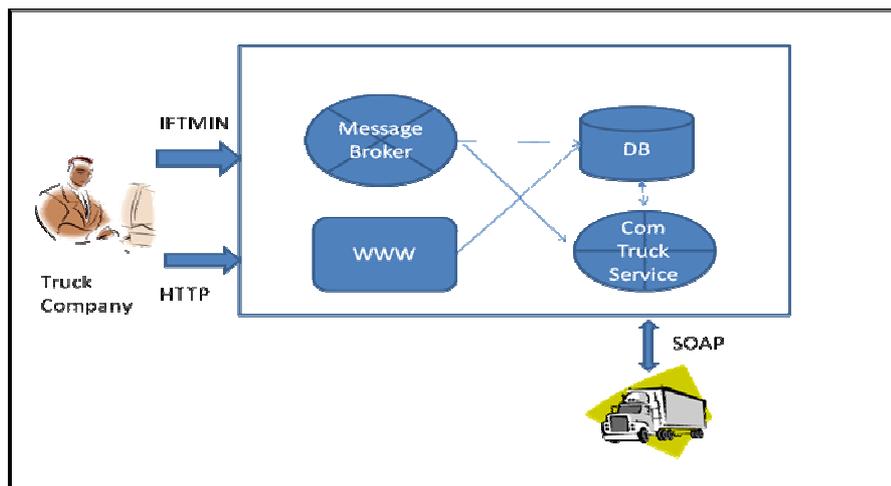


Fig 1. The concept.

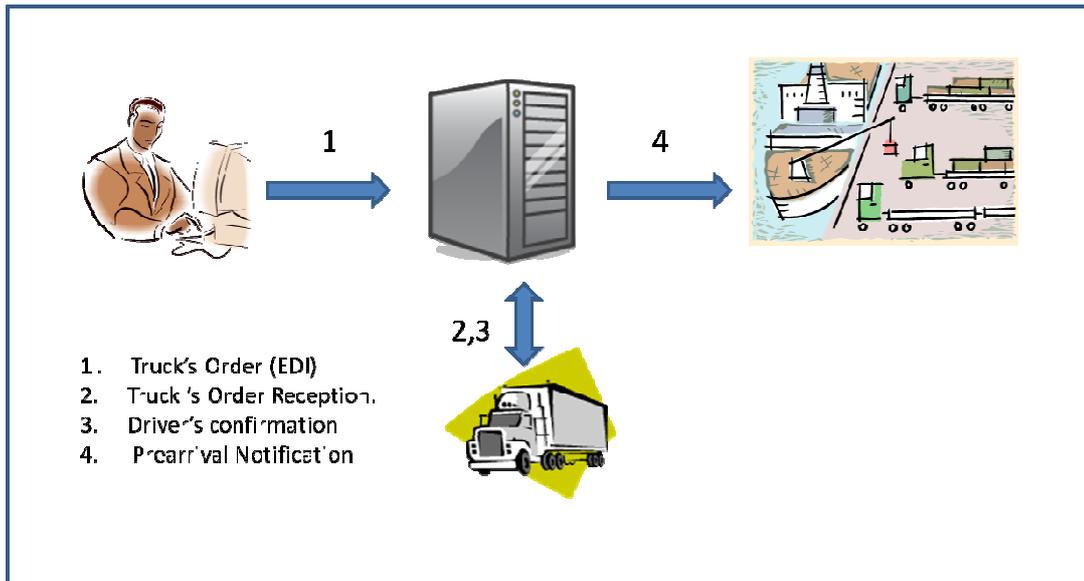
The picture below shows the interaction of the driver with the PDA.



Fig 2. The PDA

How does it Work?

1. The contractor of the container land transport (Freight Forwarder) sends a request for service to the haulage company through the platform, using an IFTMIN MESSAGE.
2. The haulage company receives the order and creates a new service into its ERP, pending for truck assignment.
3. The traffic manager assigns the service to a specific truck, taking into account the order location, nature of cargo, and fleet status. The assignment is done into the ERP and a new IFTMIN message with truck assignment is sent via PORTIC, generating at the same time the pre-arrival notification needed for gate-in/out handling at depot and container terminal.
4. PORTIC checks and verifies the service and forwards the assignment to the truck, warning the driver by a sound alert and popup message on the PDA screen. At that moment, the driver can check order details, confirm and accept the order through the PDA. On the spot or anytime later, all documents needed to execute the order can be printed in the truck cabin. This represents one of the major advantages of the system, as trucks do not need go back and forth to the office, just to fetch some papers.
5. During the service the driver can inform about the key events (arrivals, departures, incidences) pressing icons in the PDA application. Apart from that, the truck's location is sent every minute to the platform and painted on the track & trace web page using Google Maps.
6. The delivery note can be directly signed on the PDA at goods pick-up or delivery and the scanned document is printed out and sent to the haulage company reducing the administrative processing and invoicing time.



The benefits and advantages

The TRANSPORTIC system has proven to generate a wide number of benefits and competitive advantages to the companies that have adopted it, not only creating cost savings, but also improving client service and allowing new ways to optimize container logistics.

a) Direct Savings:

The system really creates direct savings in kilometers traveled, together with fuel and time reduction (driving and administrative tasks). The major advantages are stated below:

- Reduction of KM of without load. Trucks do not need to fetch documents and go to the office. Taking into account the physical configuration of the Port of Barcelona where most of the Haulage Companies are located inside the port area, we can estimate that a truck can easily save 10 Km/day. These savings represent more than 1 Million Kilometers yearly for the whole community.
- Better use of driving time. The new regulation of driving time dramatically affects the haulage companies, creating the need to optimize driving time. Companies comment to us the average time driving saving can be estimated in 25 minutes daily. This figure represents 68.750 hours saving driving.
- Reduction of administrative cost. The whole administrative process of keying data can be automatized. A rough estimation of 10 minute saving prompts us a 35.200 hour/ years of saving.
- Fleet Optimization. The system allows assigning services without stopping at the office so the traffic manager can assign services fast and easy. He also has much more flexibility to handle last-minute changes or reassign services if needed.

b) Improved client service

- Real Time information. The companies can offer a better customer service providing information about order execution and fleet location in real time to its customers. For export orders, early communication of the container and seal number is highly appreciated by the freight forwarder, to prepare for customs handling.

c) Optimization of container logistics

- Improved planning at depots, terminals and client warehouses. The information provided by the TRANSPORTIC system can be forwarded to depots, container terminals and client warehouse to optimize planning for container pick-up or delivery, and reduce waiting or queuing time for truckers. The system is a key building block for mounting any kind of Vehicle Booking System to further improve cycle times and capacity utilization, avoiding congestion.
- New models of handling land container transport

Thanks to the TRANSPORTIC system, new models of land transport can be developed, that otherwise would be cumbersome or very costly to implement. We provide some examples that are being tried out some ports, including Barcelona:

- Combine container delivery and pick-up: optimize assignments to drivers to avoid waiting time at depot or terminal gates – drivers are assigned new orders for the same depot or terminal while there's still queuing to finish the current order
- Combine goods delivery and goods pick-up: assign a new order for goods pick-up, while the driver is delivering goods at another location nearby, avoiding an "empty trip" back to the port, and the queuing time for an empty container pick-up. In case inland terminals or empty container drop-off points are mounted, the number of available combinations increases exponentially.
- Combine orders among a pool of companies: truck availability or pending orders waiting for trucks, can be published on the TRANSPORTIC web solution for a pool of haulage companies. Assignments to third-party truck drivers can be performed very easily by a simple "click".

We estimate that benefits from these new models can be even more significant than the above-mentioned direct cost savings.

d) Benefits to the port community

- Environmental impact - Reduction of CO₂. Reducing the KM the reduction of pollution is a direct consequence that it is a very significant issue for the ports.
- Reduced road and port access congestion, due to transport optimization.

The obstacles

Needless to say that the obstacles have been different for each phase of project. In early stages of design, the major concerns were price of the truck equipment (around 1.000 Euros), and the user interface of the application. Once the system was in production, the incidents that came up can be grouped in the following way:

Technology

- Low level of mobile cover. In some parts of the port the GPRS access was not available. It was needed to contact with the mobile operator to resolve this issue.

- Battery Life. It was need to design an electronic installation to keep the battery of the truck “safe” during the weekend and protect the PDA. We also needed to implement “low battery alerts” in order to inform drivers and companies.

Organizational

- The dispatching order in haulage was changed by the companies. In some companies rely on freelance driver generated some mistrust.
- Terminals, depots, exporters and importers had to accept delivery note in a termical paper of 4 inch width.

Human

- Training. Portic trained more than 1.000 drivers during 2007 in the whole port.
- Change management of drivers and traffic operators.

The Technology

As it's been previously said the PDA application was developed on Windows Mobile 5.0 (now also available in 6.0). The communication is done through internet using Web Services (SOAP) and xml messages.

In the server side we have a message broker developed by PORTIC in J2EE APACHE/TOMCAT and Oracle 10g. The service is deployed in a fault tolerance configuration with three independent lines that are continuous running providing a great level of service 99.99 %.

Complementary Services

PORTIC also offers the following services to expand and promote the use of the system.

- Integration Services. Companies need to adapt their system to receive orders electronically. Apart from that, some consultancy services are needed.
- Training services. Portic trained the drivers and traffic operators in the new operative.
- Call Center. A call center designed to resolve real time incidences of the PDA on the fly. The call center can access directly to the PDA and change or repair most of the software incidences.
- Field technician. A person has been named responsible of checking hardware, managing equipment substitution, etc. for the port community.

Conclusion

The TRANSPORTIC has created real value and savings to haulage companies that have contracted the services. We strongly believe that in a short time it will be a common feature at all the companies. The benefits for the port are very significant in terms of efficiency, modernity, and transparency. In the future, new systems can be designed, built on the equipment currently installed in the trucks.

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