International Intermodal Freight Transport
Open conference

Innovative tools for optimizing intermodal transportation: A large business case study

George Ninikas
Business Consultant – ORTEC Greece
PhD Candidate – University of the Aegean

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http://www.ortec.com
Agenda

- Company Profile
- Why Optimizing Intermodal?
- Intermodal Planning Process
- Case study
Company Profile

ORTEC: Operations Research Technology

Founded: 1981

Number of employees: >750

Customer Database: >1450

Products/Services

- “Off-the-shelf” Software Products
- Custom Software Solutions
- Professional Consulting Services
- Hosted (ASP) Solutions
- Subscription Based Model

At ORTEC, we bring enhanced decision-making processes and improved business operations to organisations around the globe. ORTEC thrives on solving large, complex resource allocation puzzles.
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An “Intermodal” Route is complex…

A route consists out of multiple “sections/legs”
...and many options are available!
Other factors should be also considered

- Cost and time-consuming operations
- Many key players involved
- Different transportation modes – increasing risk for errors
- Different regulations per country / stop
- Product restrictions (e.g. hazardous)
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- Why Optimizing Intermodal?

**Intermodal Planning Process**
- Overview
- Master Data
- Route Generator – Optimizer
- Planning
- Execution

- Case study
ORTEC Intermodal Optimizer

ORTEC has a solution for calculating a number of alternative routes for a single order from A to B (e.g. container).

Tool: ORTEC Transport & Distribution (OTD)

General Process Overview:

1. Input Data
   - Standing Data
   - Request / Quote
2. Optimizer: Route Generator
   - Generation of alternative paths
3. Planning
   - Acceptance of desired path
   - Assignment/selection of resources
4. Execution
   - Monitoring
   - Use of alternative paths in case of external disruptions
Master Data (Input – Required)

- Input consists of **master data and the route request**

- **Master data:**
  - Train/Ferry schedules (timetables)
  - Areas
  - Tariffs
  - Resources (subcontractors)
  - Other data, e.g. hazardous goods, contamination, regulations, etc.
Master Data (Input – Required)

- Timetables
- ...
- ...
- ...
- ...

The **timetable** defines when you can use a train / ferry

- Recurrence pattern (daily / weekly / monthly)
- Departure / arrival time
- Day of the week
- Period
- …..
An area is used to create a tariff (e.g. costs of taking a ferry from UK to France). It is easy to create areas with map properties:

- Country
- Region
- City
- Address
- ...
The tariff defines the costs of a particular transport mode. It is easy to create different tariffs (train / ferry / truck) for different routes.

- **From [Area 1] to [Area 2]**
- **Fixed / variable price**
- **Price per km (staffed)**
- **Price per hour**
- **...**
Request Input

- Timetables
- Areas
- Tariffs
- Other

Route Generator (Optimizer)

- Load/Unload address
- Load/Unload time window
- Lead time
- Allowed modalities
- Product
- Number of alternatives
Intermodal Route Generator

Simple Architecture Overview

External System (ERP, TMS)
- Standing Data
- Quote Entry
- Quote Reply

Advanced Planning System (APS – OTD)
- Route Engine

ORDER
- Invoice
- Order Entry
- Quote Reply

QUOTE
- Simple Architecture Overview

Planning & Execution
- Truck Computer
Intermodal Route Generator

Computing operationally the best routing for a load... taking all kind of constraints into account
Overall Planning Process

A route consists out of multiple “legs”

- Each of them can be planned independently,
- But dependencies between sections should be respected in the schedule
Order from A to B is (through the Route generator) divided in route legs. A leg is ‘a modality’.

Route can be seen as an overview of all legs to manage an order from A to B via modalities.
...or per responsible area of each dispatcher...
...or per route leg (e.g. ferry bookings)
Alternative paths are used in execution

Planned route

External circumstances require alternative actions
GPS Module allows monitoring of execution

- Real time feedback
- Real time ETA recalculation
KPIs & Reports can be easily generated

Example of real-time KPIs per route:
- Average distance per stop
- Costs per stop
- Costs per loaded quantity (e.g. pallet, tonnage, ldm)
- Empty mileage
- Maximum loaded quantity leaving depot
- Total driving time
- Total waiting time
- Total resting time
- CO2 emission
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Case study

- Company Profile
- The Problem / Challenges
- Implementation
- Benefits / Conclusion
De Rijke is a major Dutch logistics supplier.

- General Logistics Services
- Transportation
- Warehousing
- Forwarding Services

Transportation Services:
- Packaged goods
- Dry bulk products
- Liquids
- Containers
- Industrial liquid goods
De Rijke Case: The Problem

**Business & Infrastructure:**

- 6 Business Units
  - Bulk
  - Liquid
  - International Transport
  - Ferry
  - Trucking
  - Intermodal

- TMS-supplier: Cat Logic

- Transics truck computer

**Requirements:**

- Generating quotes for shipping a container from A to B
- Quote is cost price and indication for sales
- For a quote a route is evaluated on modalities, product, and tariffs.
- Black-box application
De Rijke Case: Challenges

- One general data model
- General trip definition for different business units
- Extensive tariff module
- Multiple products
- Ferry / Train legs
- Large list of additional plan restrictions (address – product – resource)
- Compartments / Contamination / Axle weight
- Quote Generator
De Rijke Case: Implementation

- Intermodal: 77 users TMS, 1000 orders/week, 80 trucks, 1000 containers
- Trucking: 14 users TMS, 750 orders/week, 75 trucks
- Continental: 47 users TMS, 800 orders/week, 320 trailers
- Liquid: 20 users TMS, 850 orders/week, 85 trucks, 160 trailers
- International: 20 users TMS, 1300 orders/week, 75 trucks, 100 trailers
- Bulk: 25 users TMS, 1500 orders/week, 125 trucks, 150 trailers

**Total:** 203 users TMS, >6500 orders/week, >400 trucks, >700 trailers

73 users OTD
De Rijke Case: Benefits & Conclusion

- **Work more efficient/ reduce cost**
  - Business units merged
  - Reducing costs through collaboration, less travels, exploit low-cost opportunities, etc.

- **Work more efficient/ reduce complexity**
  - Inter-modal business unit now centralised. No decentralized (locally optimized) decisions.

- **Reduce complexity**
  - 1 centralized application included in TMS, and mobile devices

- **Supportive to growth strategy**
Thank you for your attention!

George Ninikas

George.Ninikas@ortec.com