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School of
Economics

Research for a container terminal

Motivation from practice – May 2017

Bart van Riessen

Erasmus University Rotterdam

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ECT ROTTERDAM

About me

ECT

- 2012-13 Internship synchromodal hinterland optimisation
- 2013-16 Hinterland development
- 2017 - … Product manager Digital & supply chain services

Education

- 2013 MSc in Transportation engineering and logistics
  Delft University of Technology
- 2013 MSc in Operations research & Quantitative logistics
  Erasmus University Rotterdam
- 2013 - … PhD research synchromodal hinterland optimisation
  prof R. Dekker (EUR) and dr. R. Negenborn (TUD)

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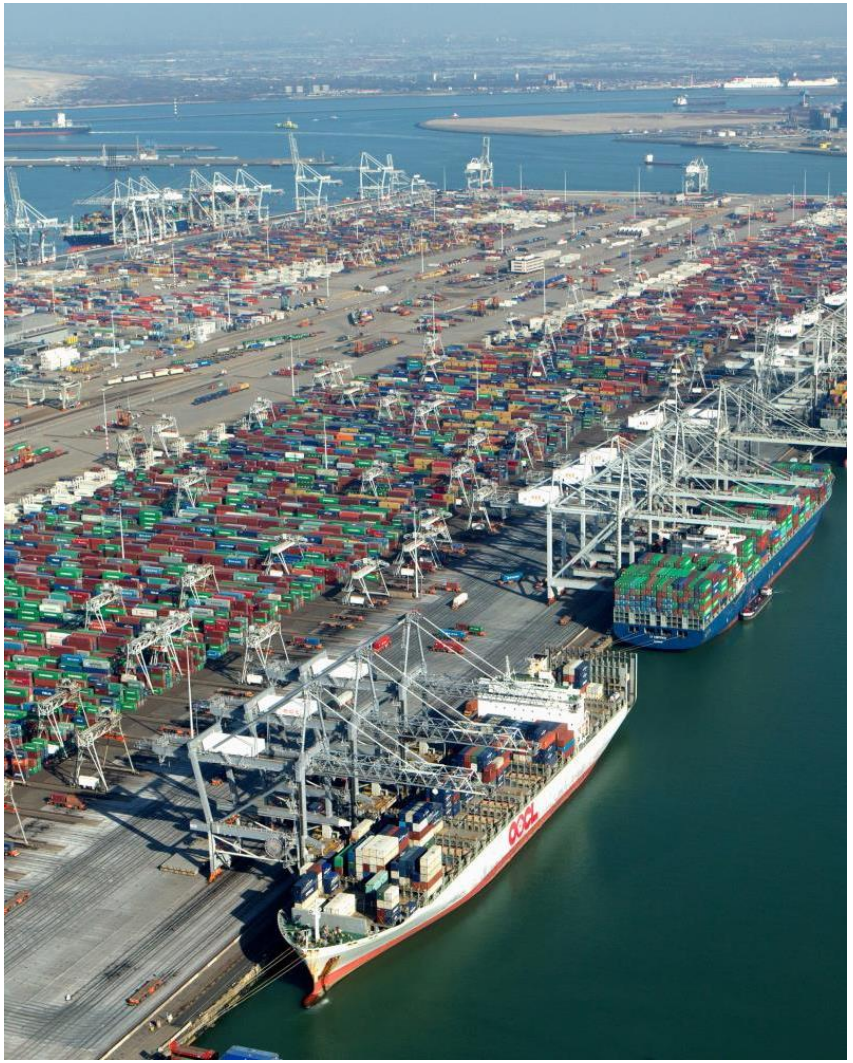
ECT Delta terminal

±5 million TEU

- Total area: 672 acres
- Quay length: 2.5 miles
- 38 quay cranes



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ECT Euromax Terminal

±2 million TEU

- Total area: 208 acres
- Quay length: 1 mile
- 16 quay cranes

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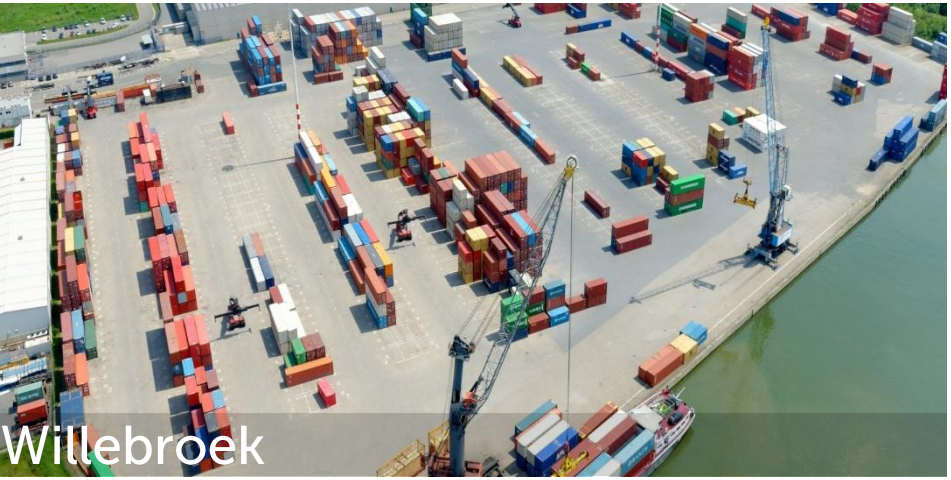
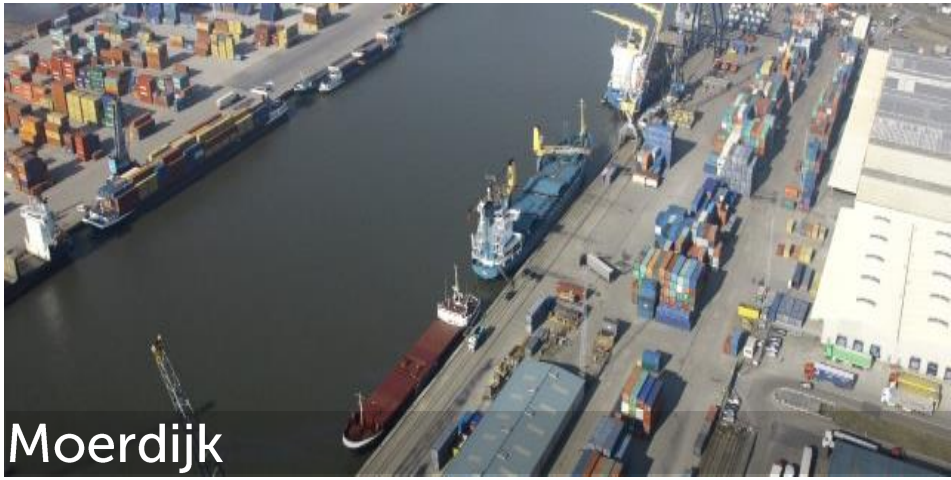
Inland terminals





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Challenges

Attract deep-sea vessel handlings

Import/export cargo

Transhipment

Access to the hinterland

Connect to the end-user

Understanding liner networks

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How does research support ECT?

1. Understanding liner networks
   - Liner network design (impact of ULCS)
   - Deep-sea carrier networks: port and terminal choice preferences
2. Access to the hinterland
   - Impact of disturbances
   - Extended gates: European Gateway Services
   - Synchromodality: demand, supply, service portfolio (a.o. ISOLA)
3. Connect to the end-user
   - Shipper's preferences (ISOLA, EURECA)
   - Multilevel information sharing (digitisation)

Our container logistics research in the past 4 years:

- Involved 5 universities
- Directly connected to 10 PhD researches
- Supported internships for over 15 MSc theses

How does a liner select a terminal?

Internship Hupkens

Circumstance for port choice and terminal choice change rapidly

- ULCS
- Alliances
- Blank sailings
- Double calls
- Far East trade drop
- Competition in Europe
- Consolidation issues
- Alternative routes

Main drivers:

- Administrative process
- Production rates
- Costs

CSCL Globe (19100 TEU) at ECT

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What is the optimal route for a ULCS?

Internship Hollemans
PhD research Milovanovich

Increased vessel capacity:

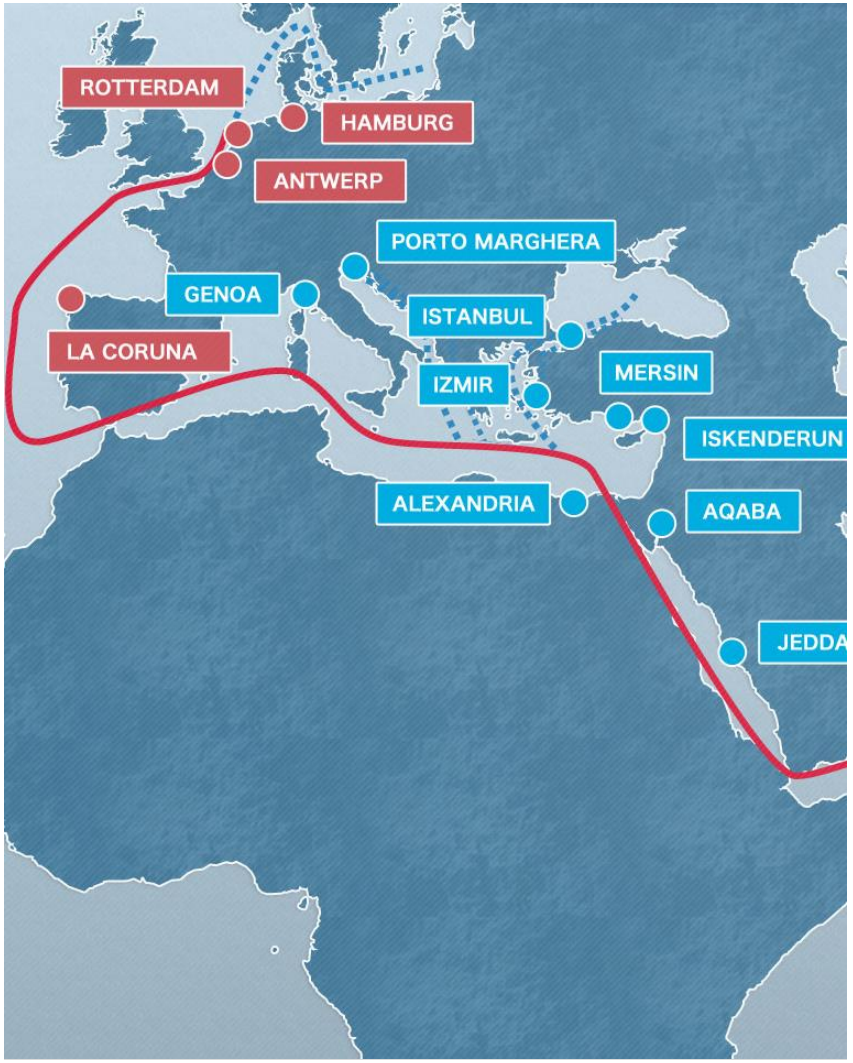
- Extended routes?
- More import/export?
- More transhipment?

European case:

→For minimizing costs, hinterland transportation costs are the main driver

→Very close ports can be substitutes, transhipment is only viable on longer distances

(Work in progress)



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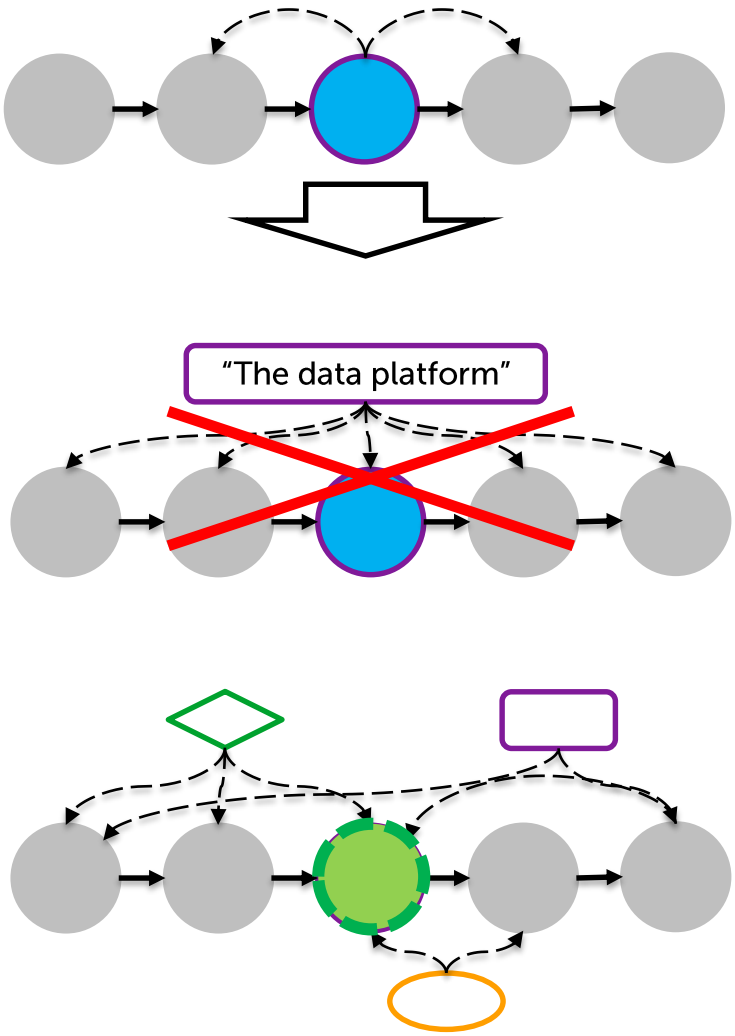
How can we learn from shippers' data?

Internship Thelen

- Data exchanges with directly adjacent nodes exist. However:
- Supply chain overview required
- Multilevel information sharing
- Single platform not feasible,
- … and not sufficiently flexible
- Multiple information platforms provide different needs

→How can we support and gain from supply chain benefits of information sharing?



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How do we connect to the hinterland?

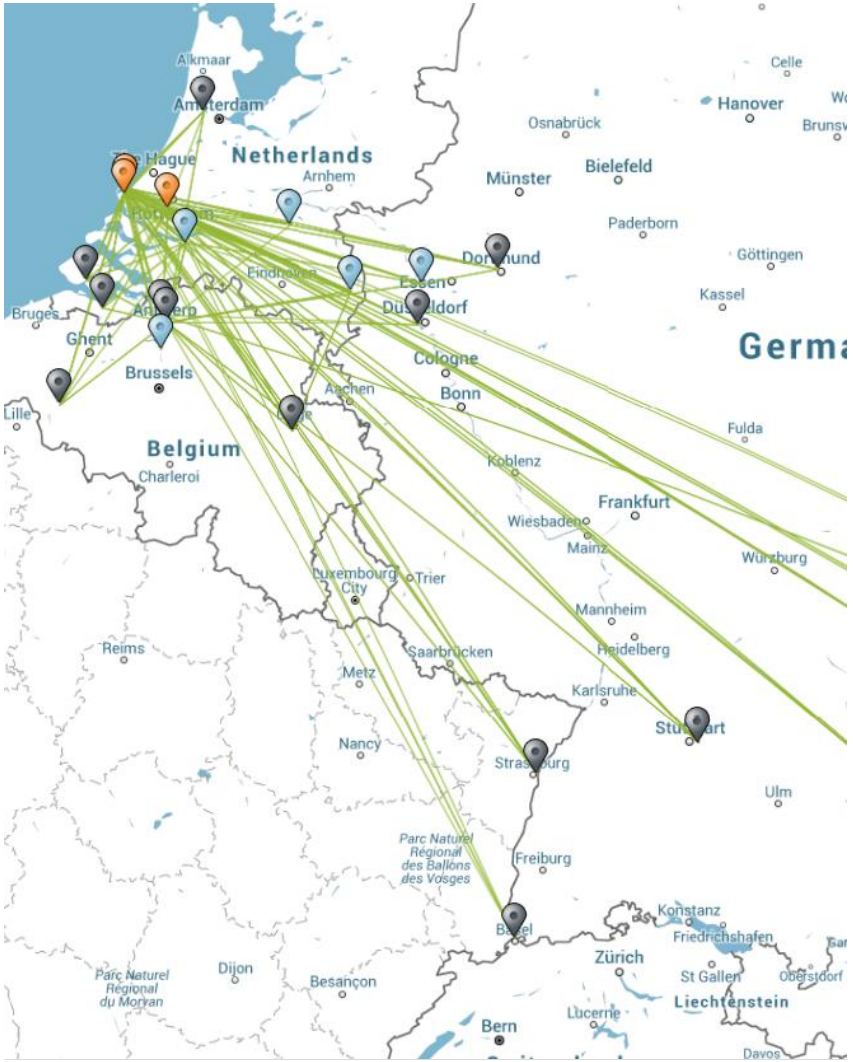
European Gateway Services

Synchronized intermodality[1]:

- Transportation service
- Flexible planning, booking and management
- Focus on up-to-date information

Decisions:

- Mode, route and timing
- Per individual shipment in a network
- As late as possible
- Considering global network optimization



[1] Adapted from: Tavasszy, L. A., Behdani, B., & Konings, R. (2015). Intermodality and Synchromodality. *Available at SSRN 2592888*.

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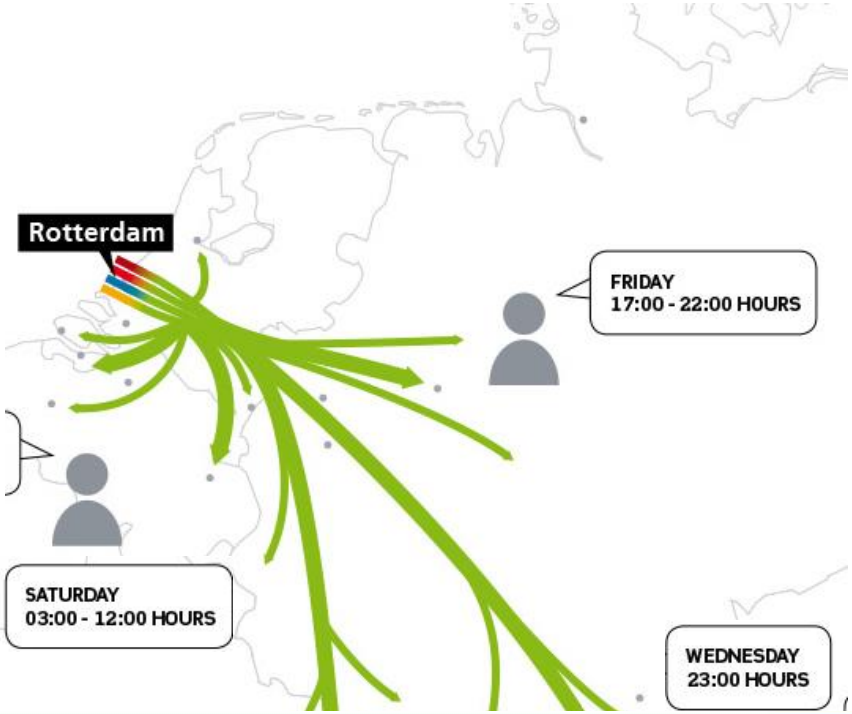
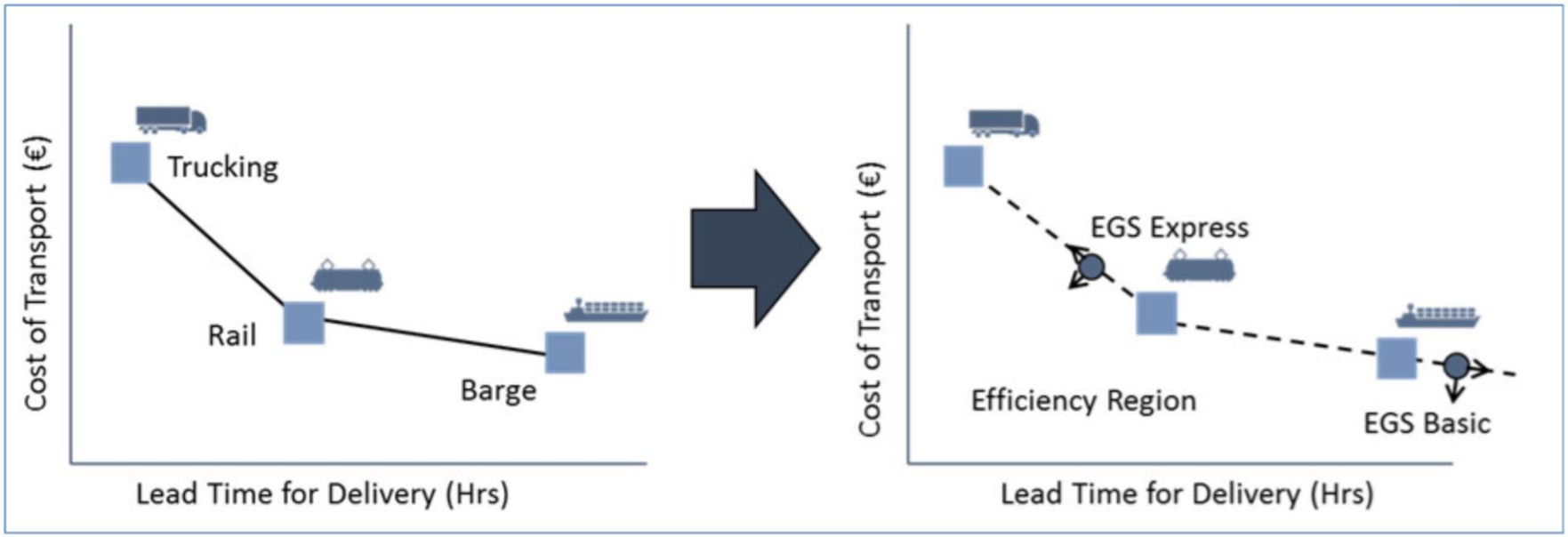
What transportation do shippers want?

Internships Verkaik, Lecona
PhD research Khakdaman

- Very heterogeneous market
- Little insight in SME requirements
- 3 characteristics are most relevant: Time, price, reliability





Differentiated transport services

Examples of intermodal revenue management in literature:

Accept/reject per order:

- Bilegan *et al* (2013): rail container corridor
- Wang *et al.* (2016): barge corridor

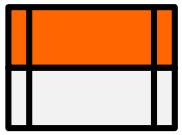
Price per OD pair:

- Ypsilantis and Zuidwijk (2013): Joint network design and pricing

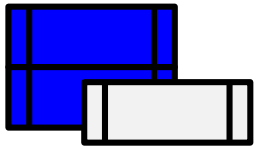
What is the best service offering?

Lin, Mulder, Van Riessen

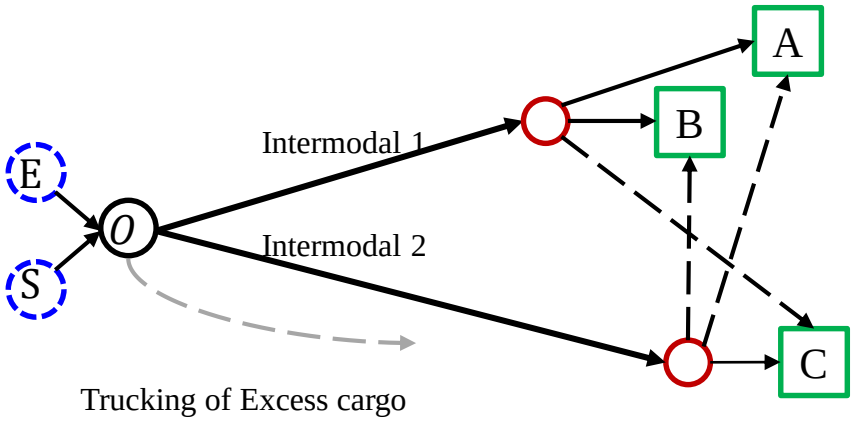
- Portfolio with differentiated service levels



❑**Express delivery**
(1 day) **€150**



❑**Standard delivery**
(2 days) **€125**



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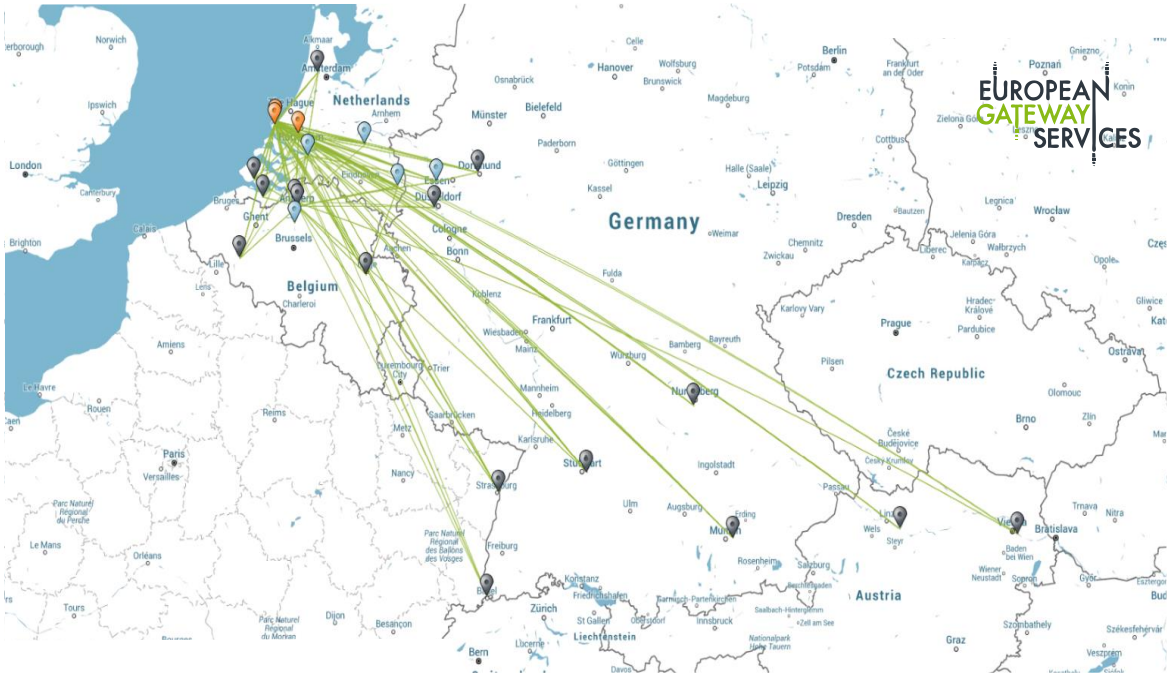
Implementation in practice

European Gateway Services
- 4 planning locations, 20+ corridors, 500+ customers
- Implementation Synchromodal trip optimiser
- Synchromodal service portfolio

Barriers:
- Timing of information
- No standardised service levels
- Multiple actors
- Conservative industry



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