let's GO

Developing Optimising Saving Learning

TNT

sure we can

Speakers

John Poppelaars
Founder/Director
Doing The Math

Frank van der Wal
Expert OR Consultant
ORTEC

Hein Fleuren
Co-Founder Zero Hunger Lab
Tilburg University

It’s a team effort!

Supply chain wide optimization at TNT Express

Organization & Problem

John Poppelaars

The express business: A very complex one

Highly volatile demand

Regulations

Tight service requirements

Network reconfigurations

TNT's ambitions

Better service

Unit cost reduction

Better & faster fact-based decision-making

Reduce CO2 emissions

GO-Program

Optimization solutions

Communities of Practice

GO-Academy

Cumulative savings from 2008-2011:

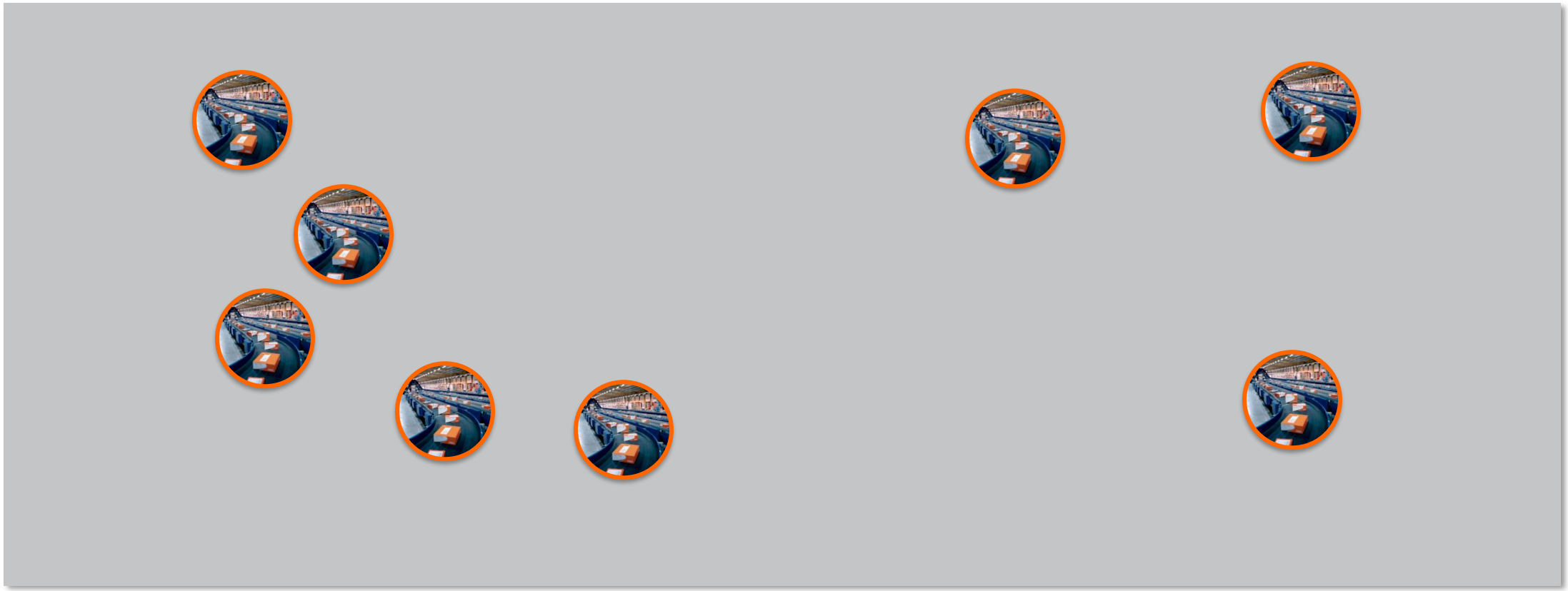
€ 207 mln

Supply chain wide optimization at TNT Express

Optimization solutions

Frank van der Wal

What is the best network?



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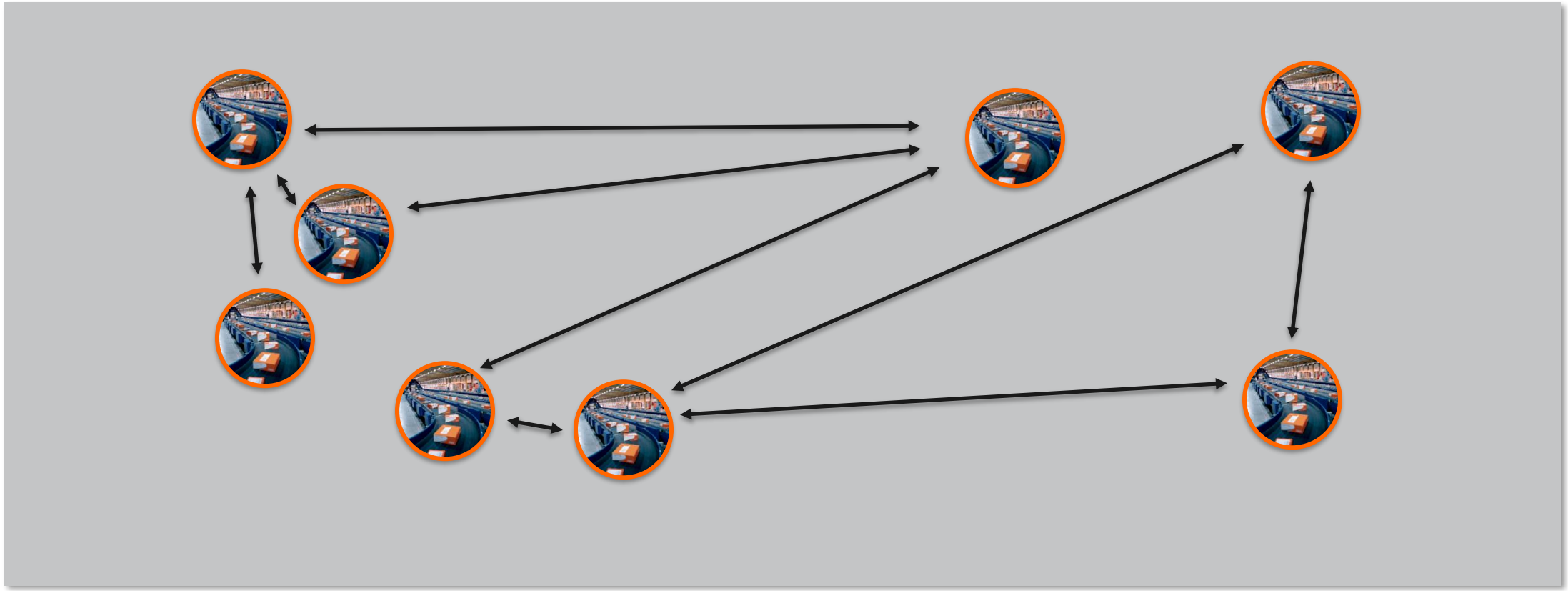

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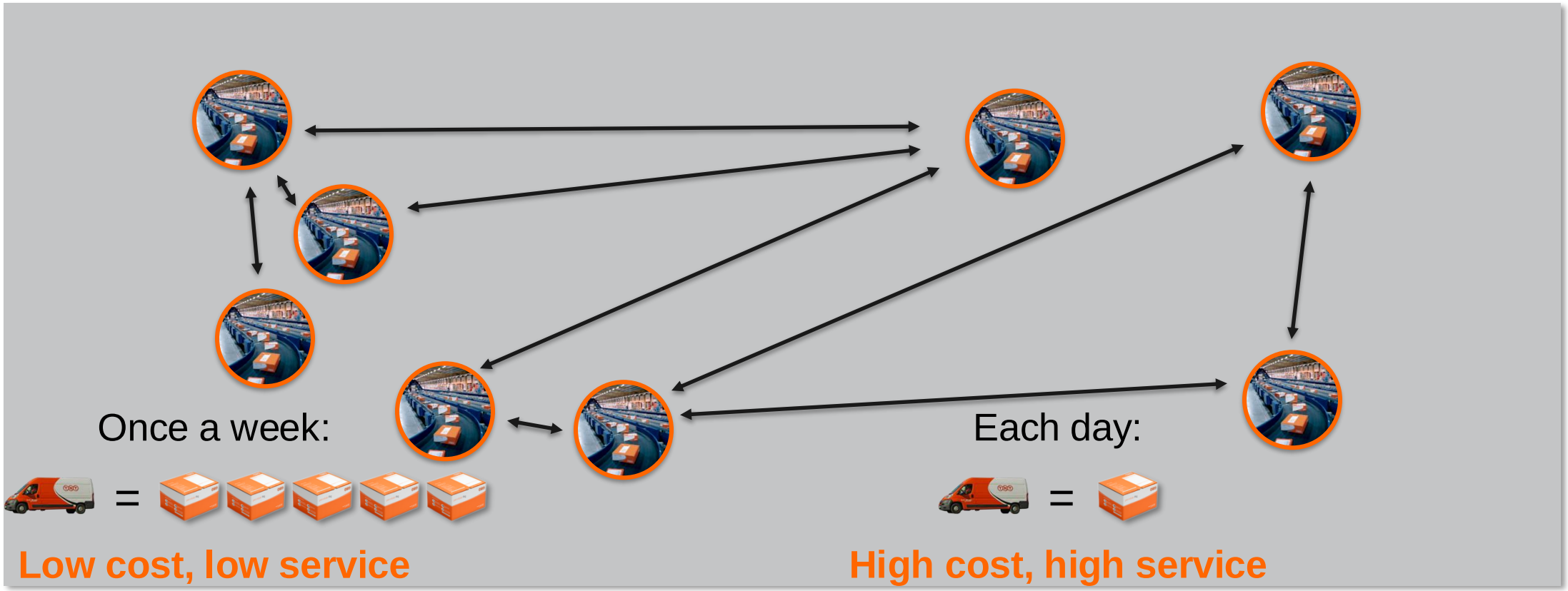
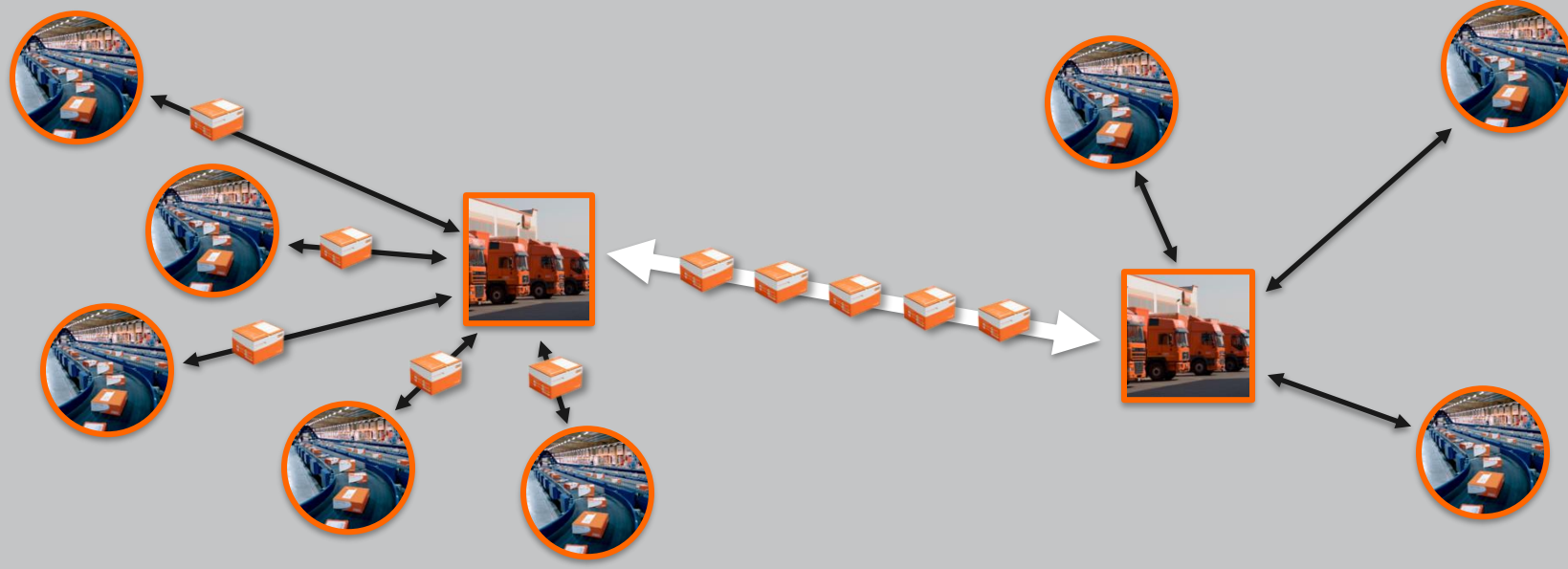
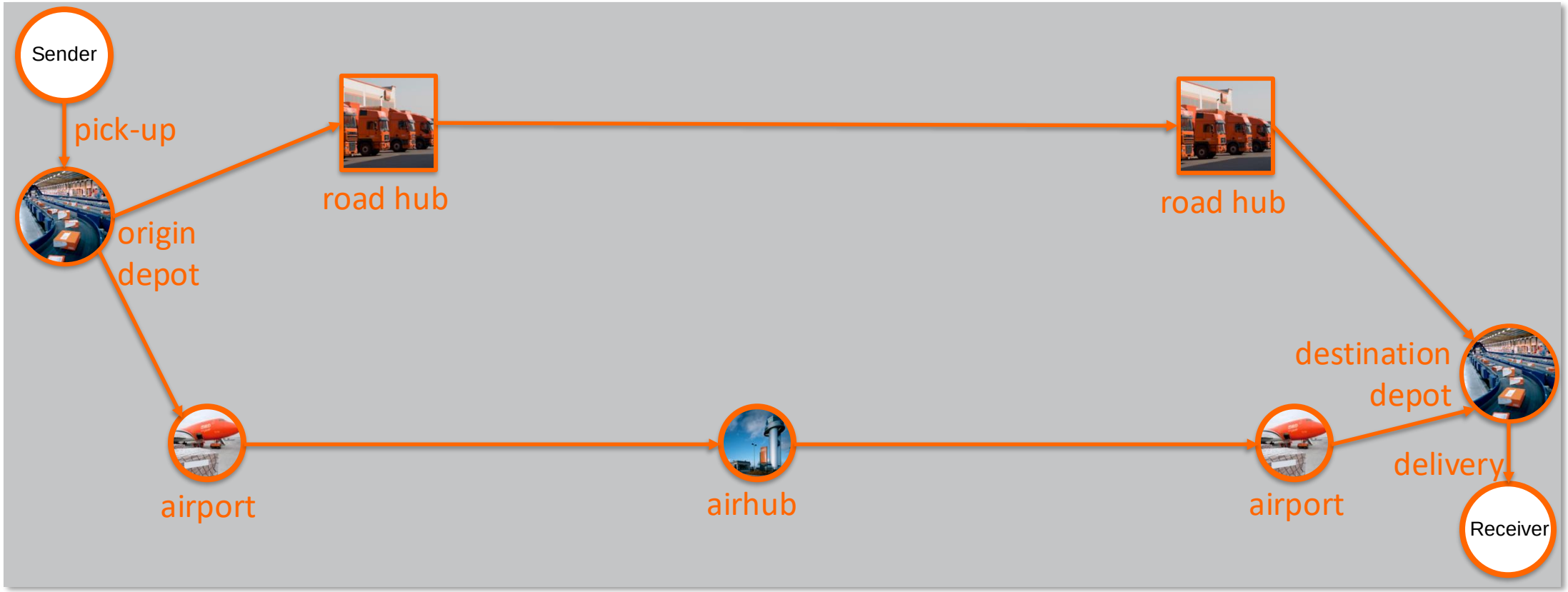


The hub and spoke alternative

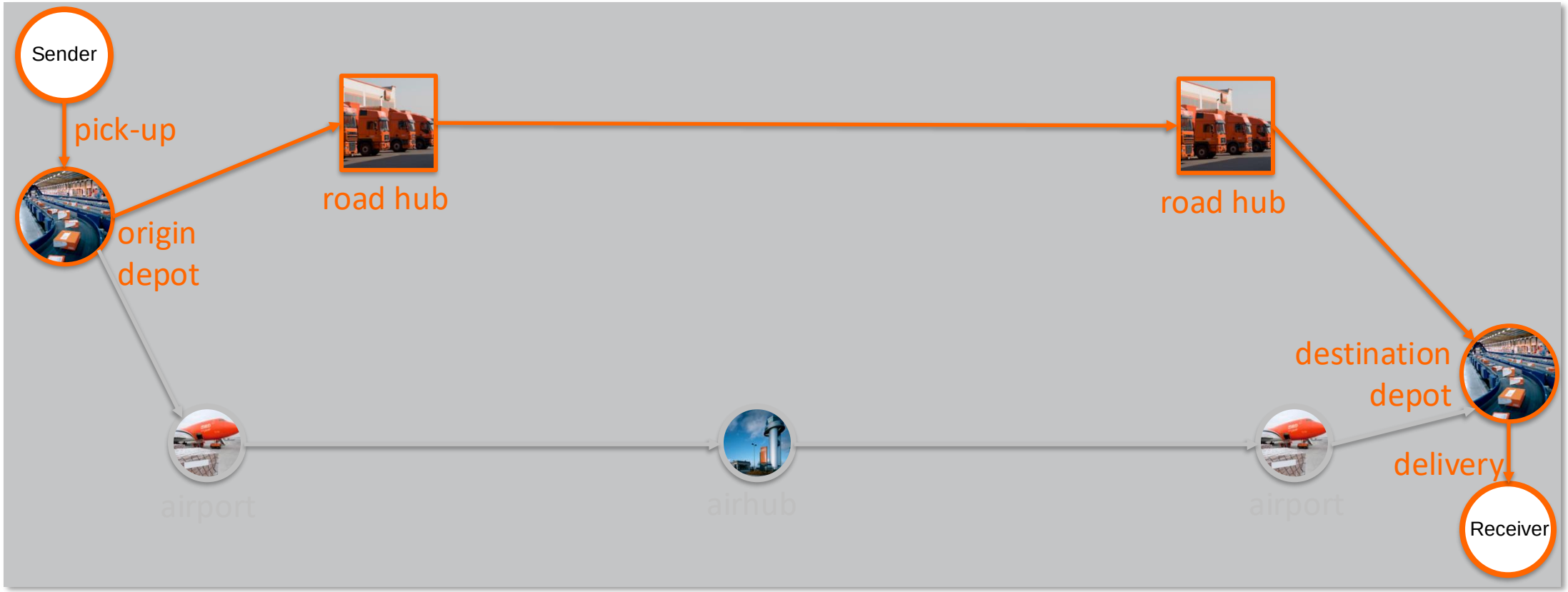


Each day: low cost, high service

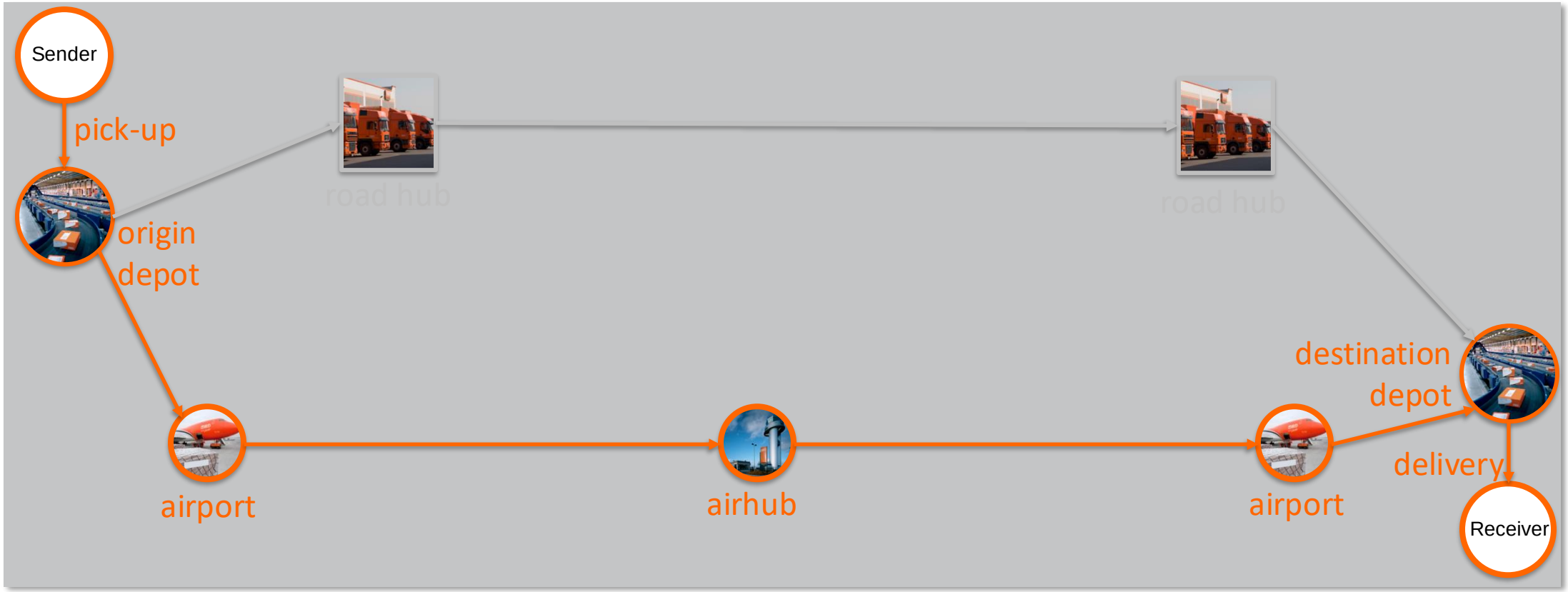
Example network



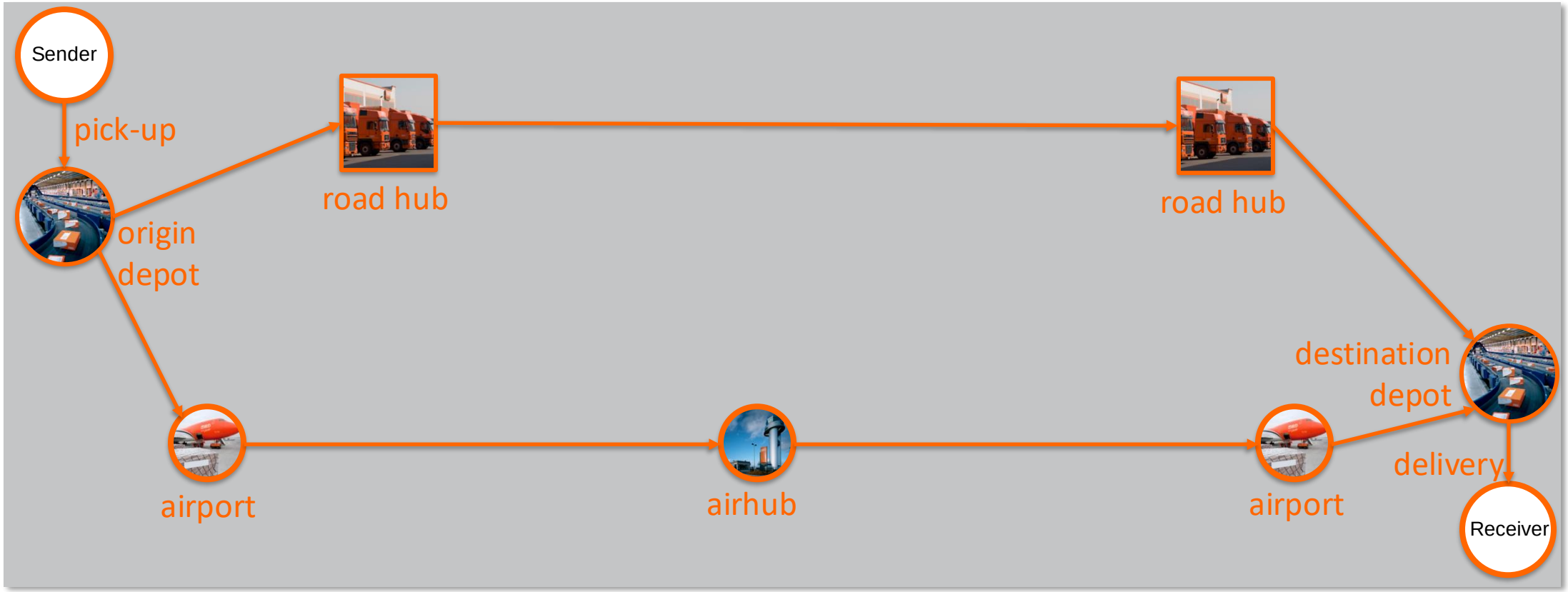
Example road network



Example air network

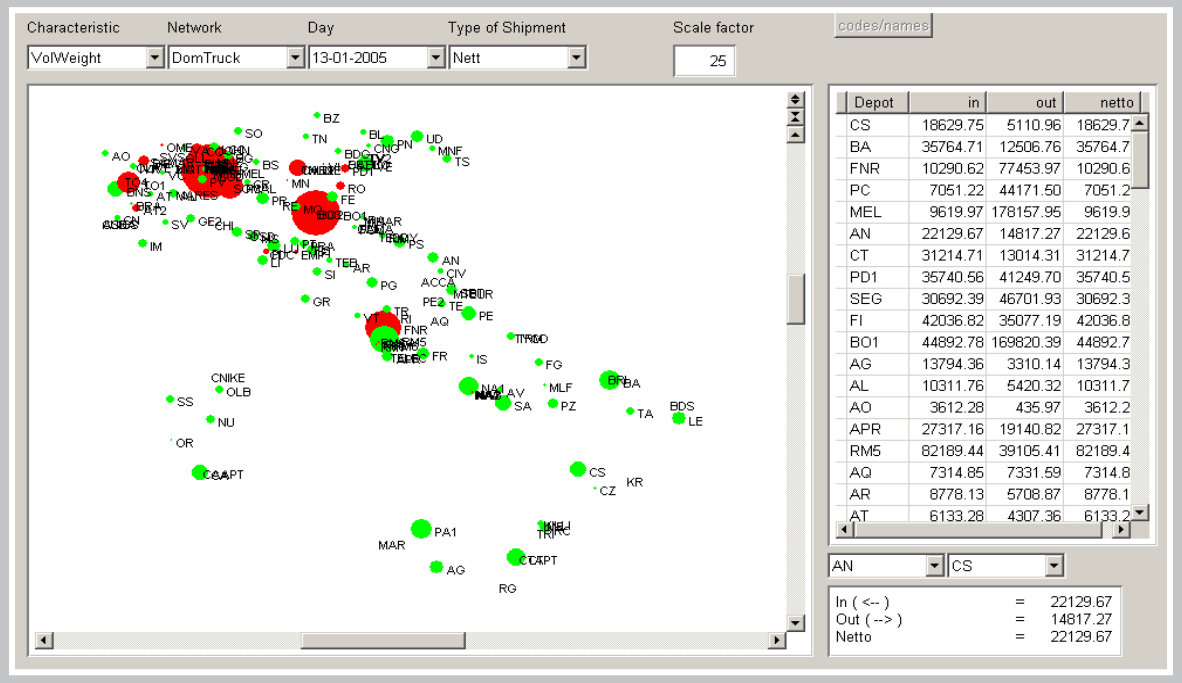


Example network

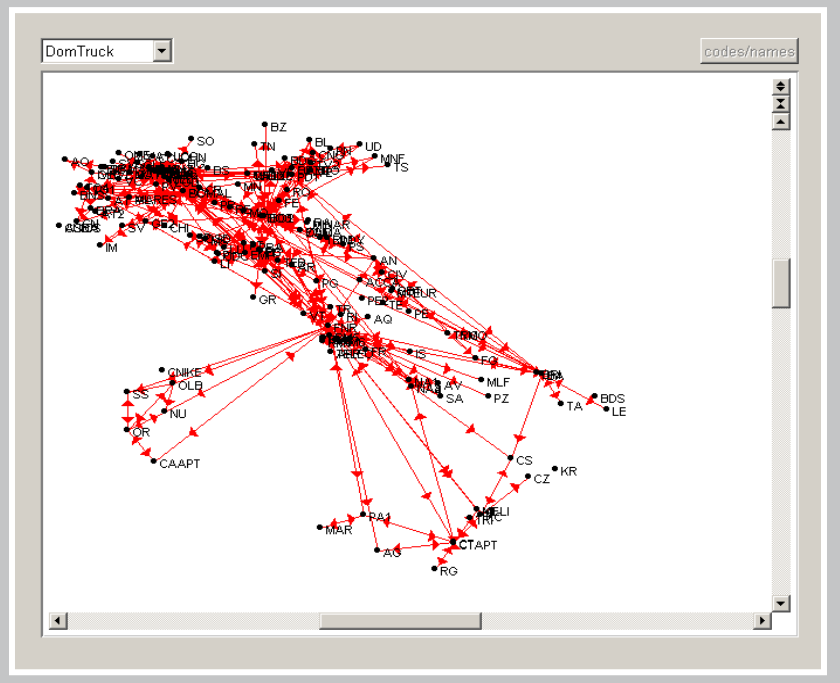


Early TRANS in Italy

Volume information



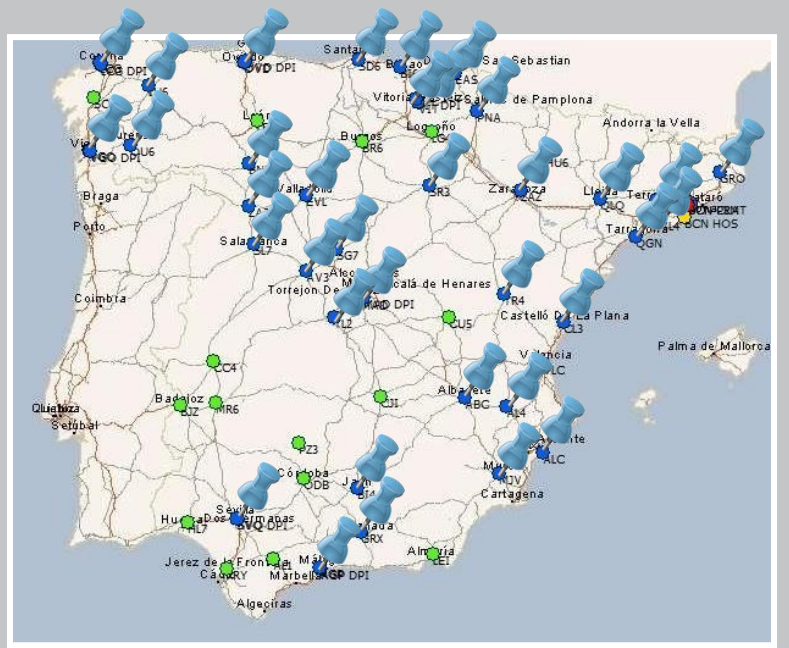
Italian network



Screenshot Service Capability Analyzer

Old situation from Barcelona

New situation from Barcelona



- Fastest route takes 1 day
- Fastest route takes 2 days

The ROUTE module in TRANS

Criteria of ranking routes

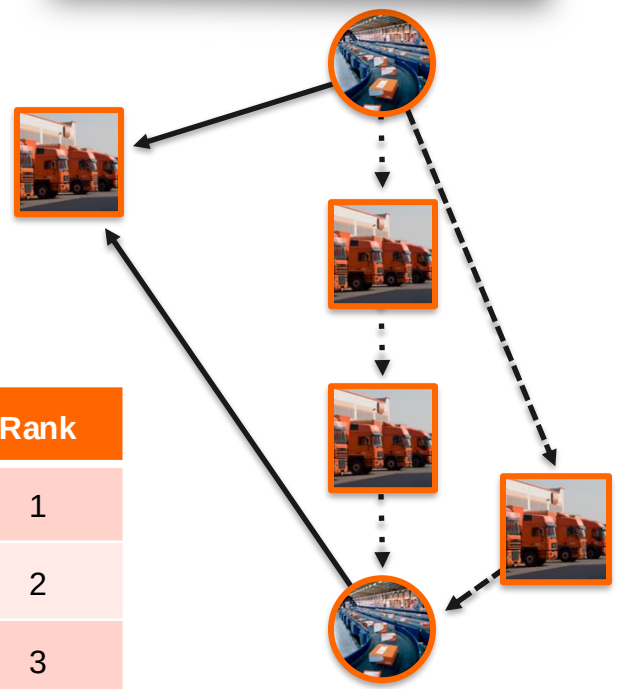
1. Hub touches
2. Arrival time at destination depot
3. Departure time at origin depot

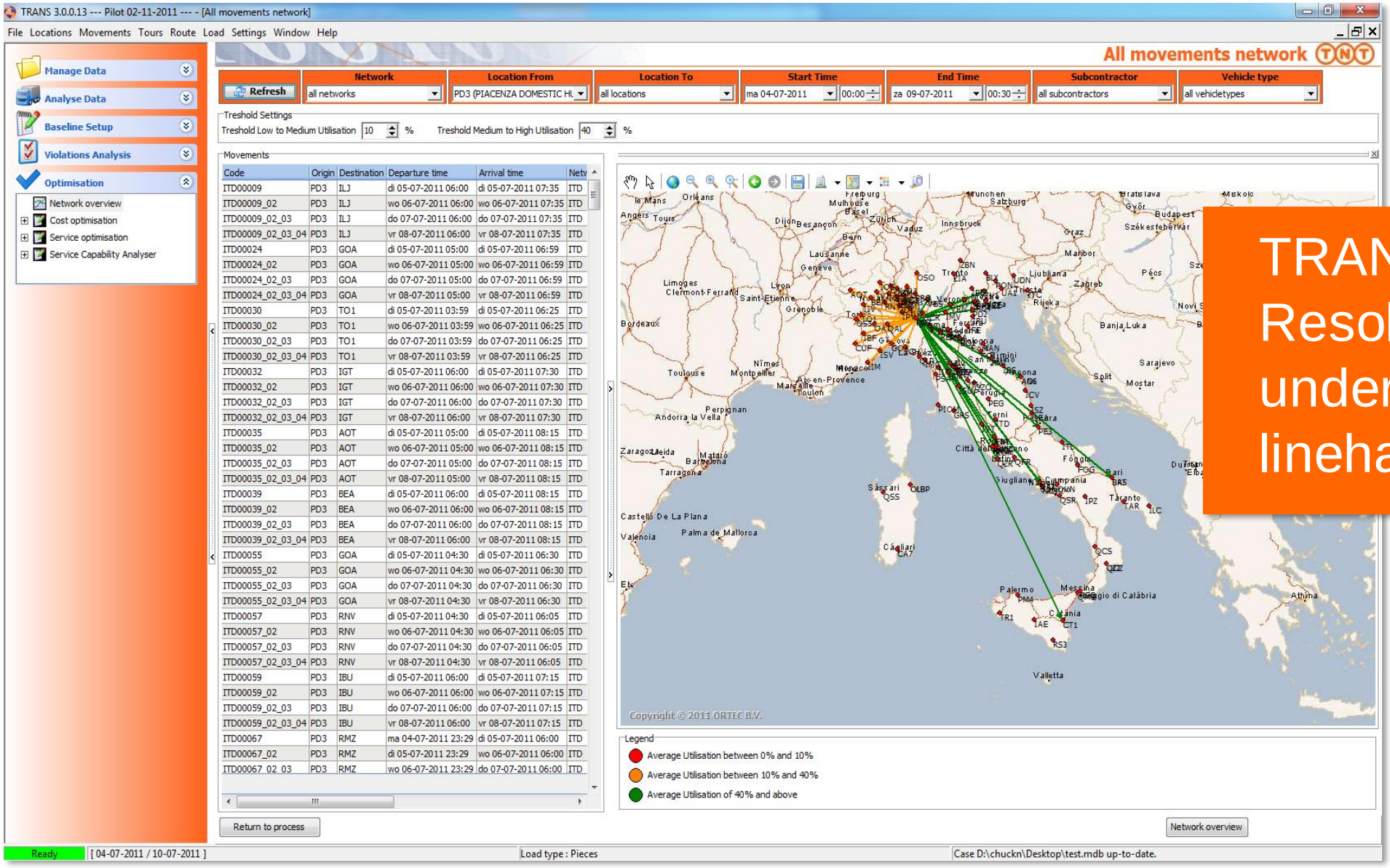
Takes existing transport movements

Per origin-destination small branch & bound on feasible routes

Example possible routes from one origin to one destination

Route	#Hub	Dep.T.	Arr.T.	Rank
——→	1	08:00 pm	06:00 am	1
- - - - - →	1	08:00 pm	07:00 am	2
· · · · · →	2	09:00 pm	08:00 am	3





TRANS: Resolving under-utilized linehauls

Other modules in TRANS

TRANS Modules

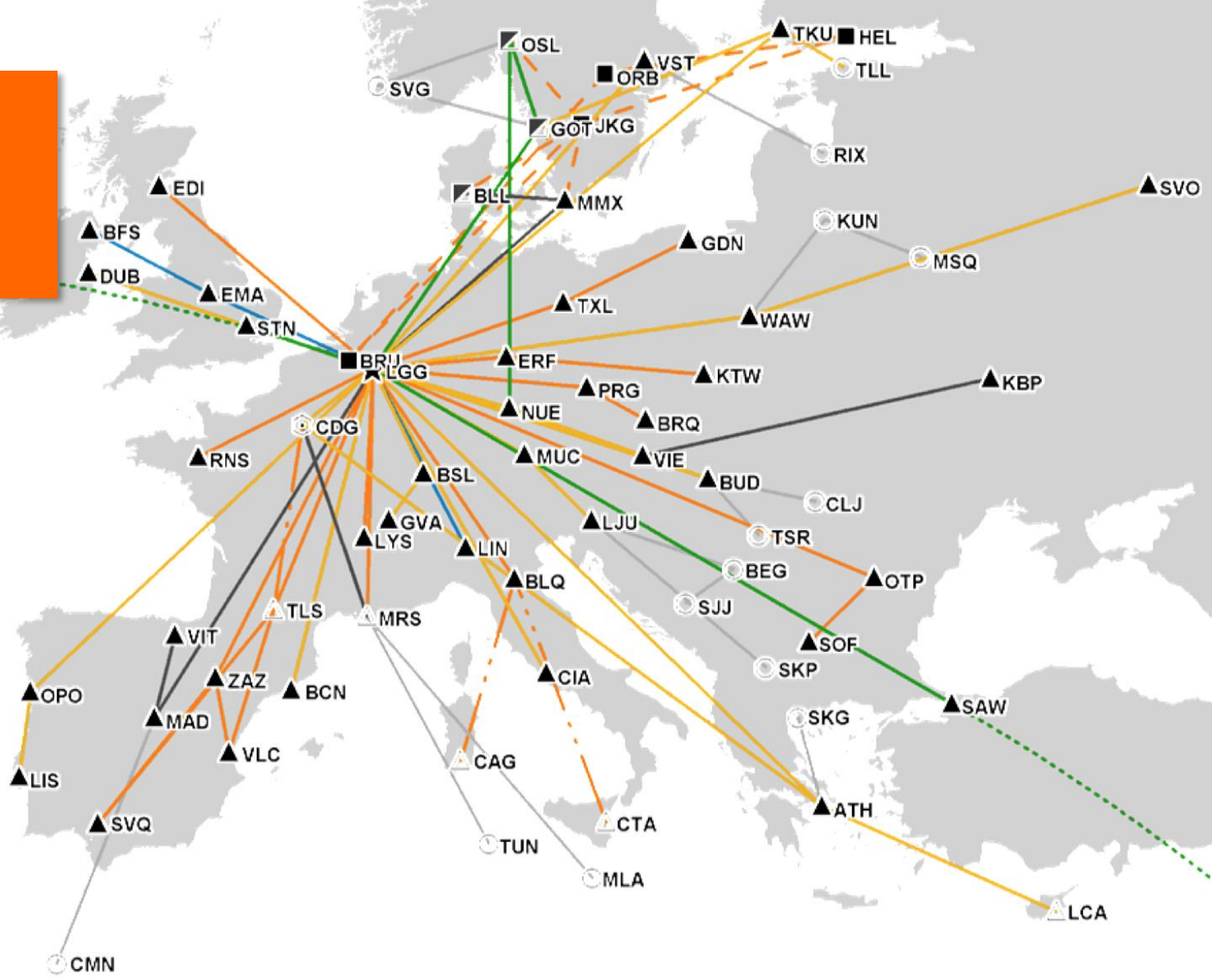
Service Capability Analyzer	Routing	Tour Generation	Optimal Routing	Movement Heuristic
Shortest path	Branch & Bound	Set Partitioning	MIP*	Heuristic*

* Meuffels, I., Fleuren, H., Cruijssen, F. & Van Dam, E., 2010
Enriching the tactical network design of express carriers with fleet scheduling characteristics
Flexible Services and Manufacturing Journal, 22(1-2), pp. 3-35

Difficulties in TRANS implementation

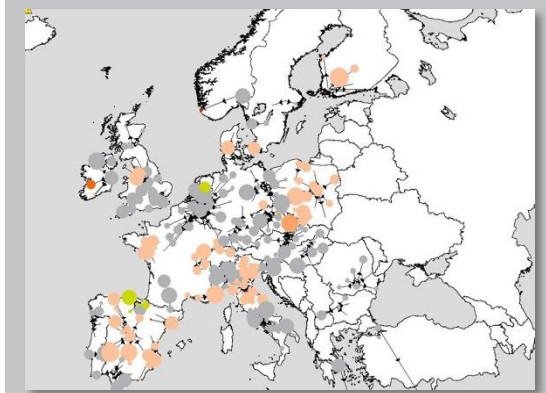
Data quality	Work groups with IT-department Adaptors Extensive data checks on entrance
Functional requirements for so many countries	COPs Early involvement senior management
Getting people to use tools	Gradual development Involvement via COPs GO-Academy

European Air Network

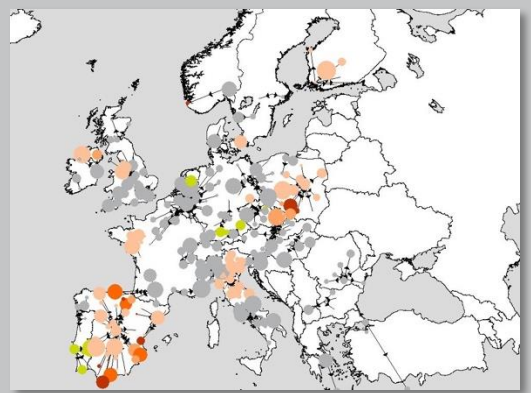


Scenario examples (on randomized data)

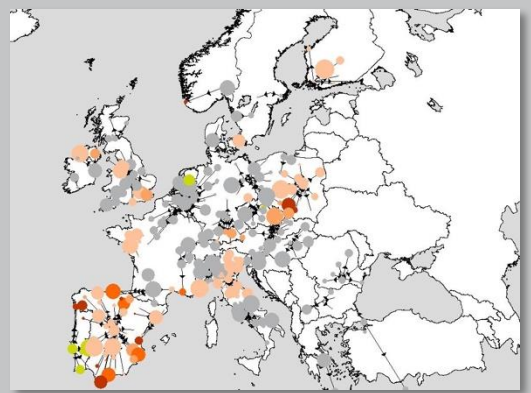
Service impact



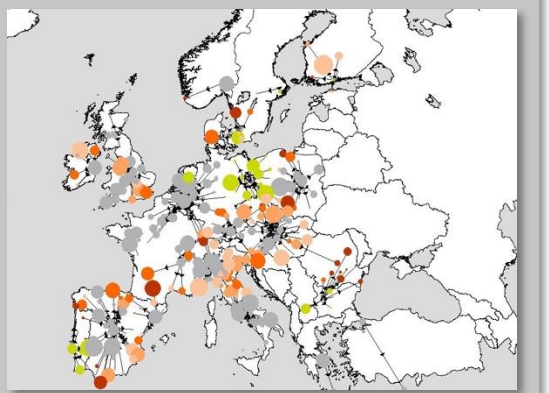
1. Low
Cost 95%



2. Medium
Cost 79%

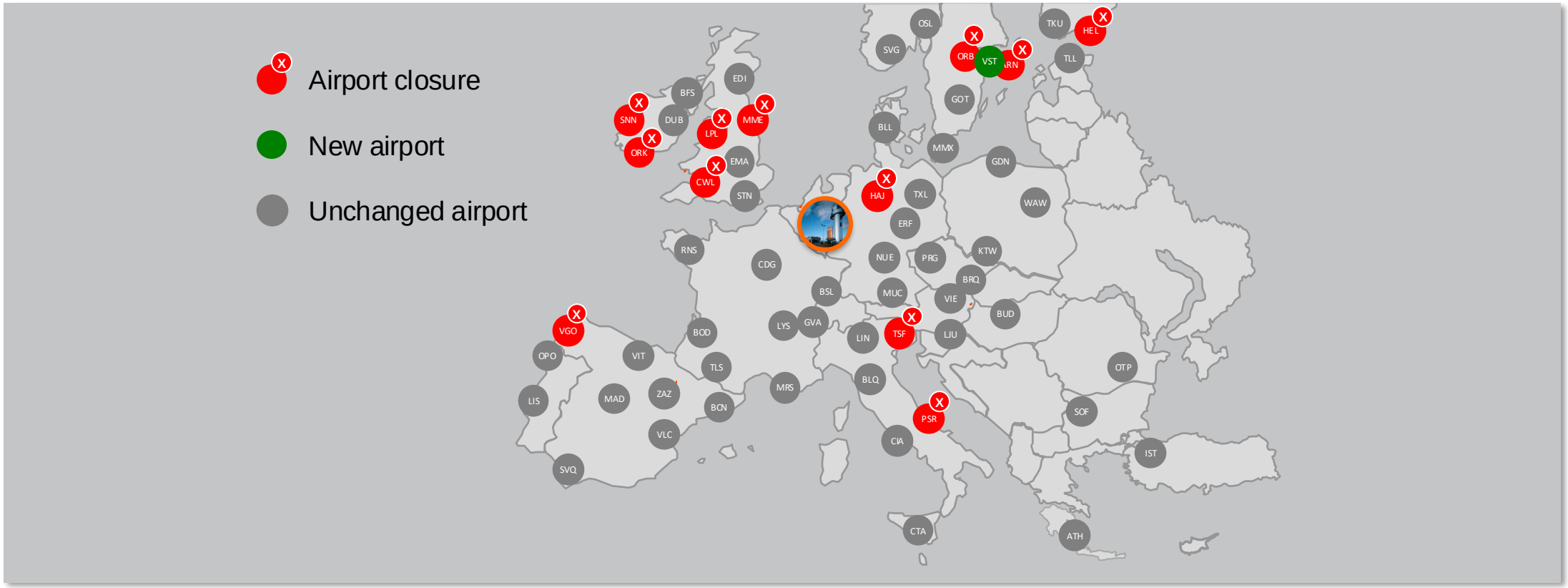


3. High
Cost 72%



4. Extreme
Cost 62%

Final result after management decision

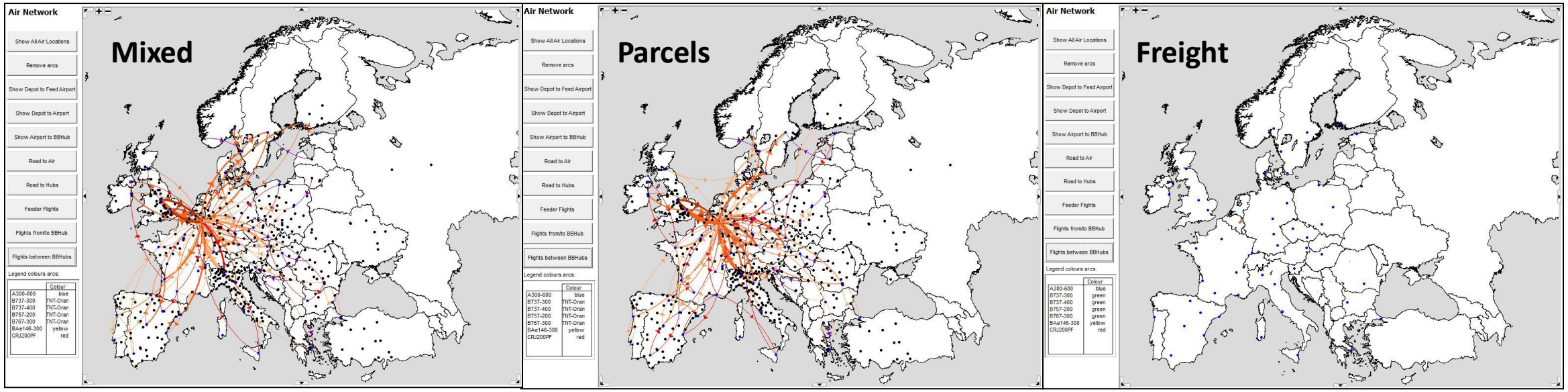


DELTA Supply Chain Model

Integrate relevant supply chain elements in one model to enable strategic decision making

- Road network
- Air network
- Pickup- & delivery cost
- Depot and hub handling

DELTA SC: Only parcels in air network



DELTA SC has been used to investigate the situation where freight is taken out of the air.
Freight definitions used: >30 kg, or >250 kg

Other DELTA Models

Depot infrastructure optimization

Hub infrastructure optimization

Hub and network optimization

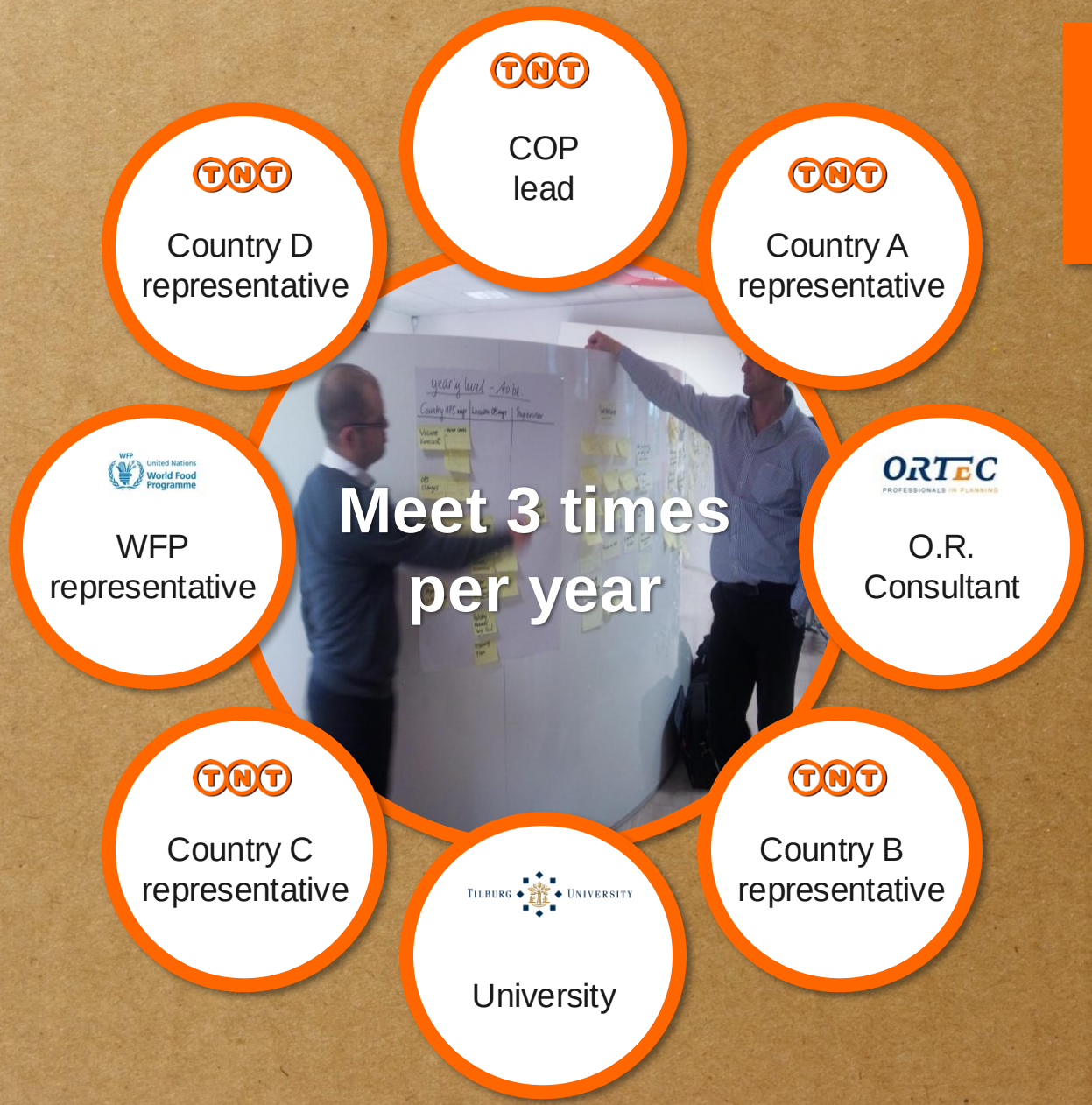
Supply chain wide optimization at TNT Express

COPs & GO Academy

Hein Fleuren

Communities of Practice

Development of tools: In COP



Supply chain wide optimization at TNT Express

GO-Academy

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Outline of GO-Academy

6 modules
over a period of
two years

TIAS Supply Chain certificate

Module	Name	Topics
1	Introduction module	Customers and their supply chains
2	Strategic optimization	Infrastructure design (DELTA)
3	Networks & PUD	Planning in Networks and PUD (TRANS & SHORTREC)
4	Hubs & depots	Bottleneck theory, mechanization principles
5	Implementation	Change management techniques
6	Graduation	Presenting for impact, elevator pitches

Benefits of GO-Academy

- 400 people staff and senior management trained
- One ‘language’ for optimization
- Master cases:
  - Real business cases
  - Defined & sponsored by senior management
  - Deliver significant ROI
- Retention of talented staff
- Improved optimization capability
- Strong Supply Chain Masters network

GO Subprogram	Accumulated Savings
Networks	48 M€
PUD / Warehouse	27 M€
Supply Chain	132 M€
Total	**207 M€**

CO_2 emission reduction of 283 Million kg

(1,000 trucks 7 times around the earth)

Lessons learned--> important for FE-award!!

- Build up trust of users & senior management by succesful implementations
- Fact-based analysis might differ from people expectations
- Benefit tracking & changing business environment
- Maturing of decision making

Thank you

sure we can