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Fleet Telematics

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LPZ  **E-BUSINESS**
applied telematics

Overview

1. Motivation

- Development of Freight Transport
- Customer Expectations
- Regulations

2. Real-time Management

- Fleet Telematics Systems
- Logistics Systems
- Integration of Telematics and Logistics System

3. Real-time Decision Support

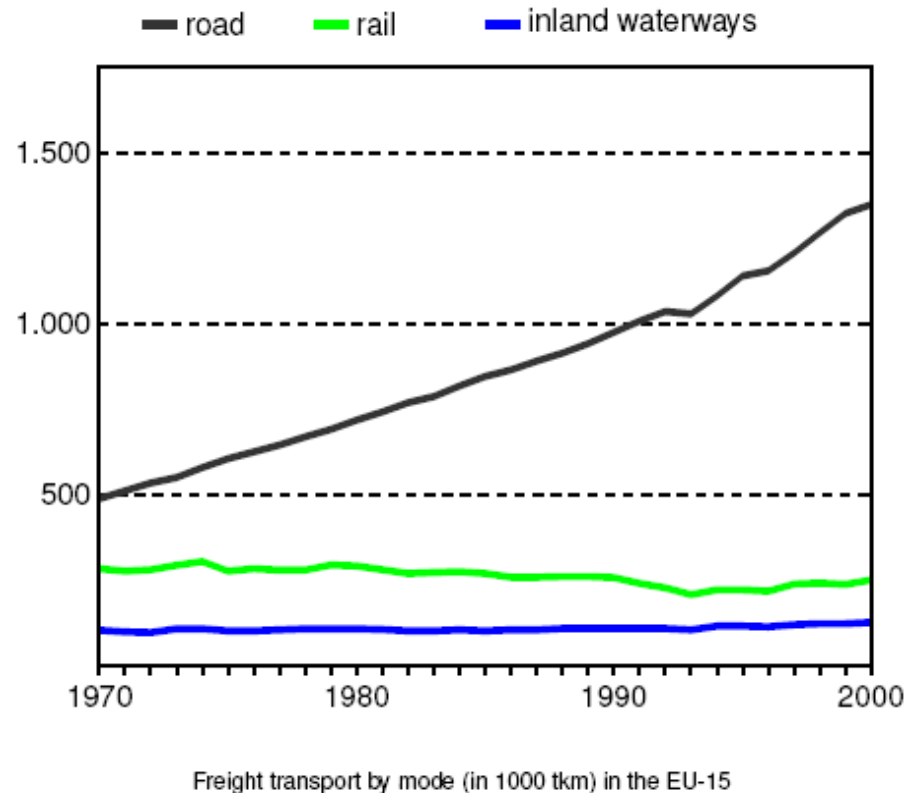
- Collaborative Decision Making
- Dynamic Vehicle Routing

4. Supply Chain Visibility

5. Concluding Remarks

Development of Freight Transport in the EU

- Intra-trade within the European Union (EU-15)
 - 1980: ~360.000 million EUR
 - 2000: ~1.100.000 million EUR
- Growth almost entirely realised by road transport!

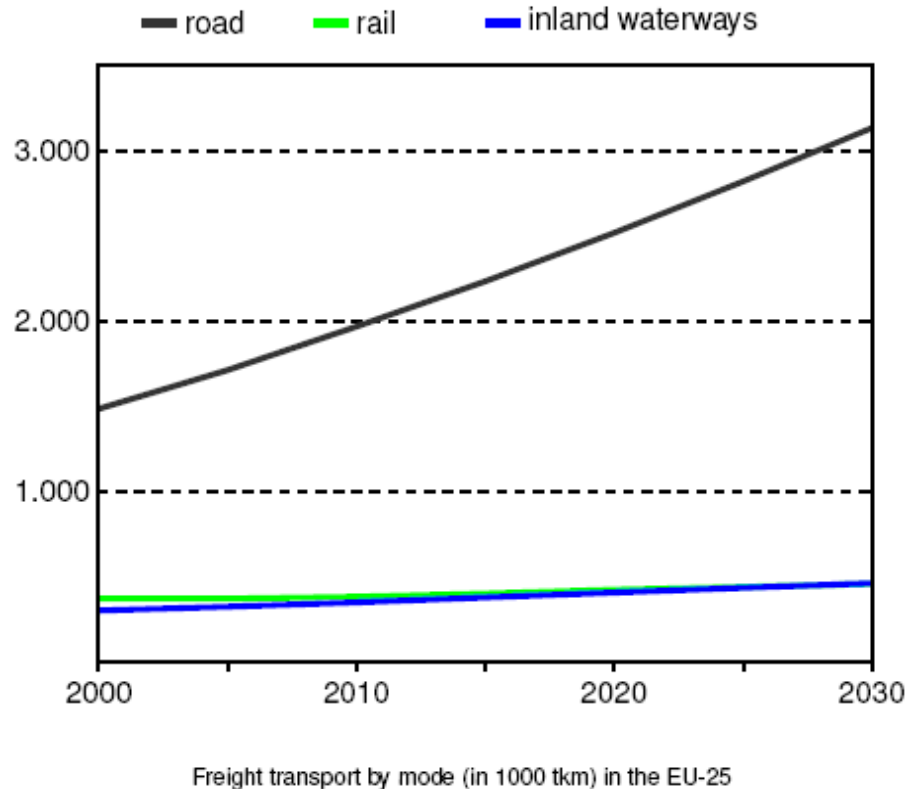


Development of Freight Transport in the EU

- The trend of development will continue!

Reasons for growth:

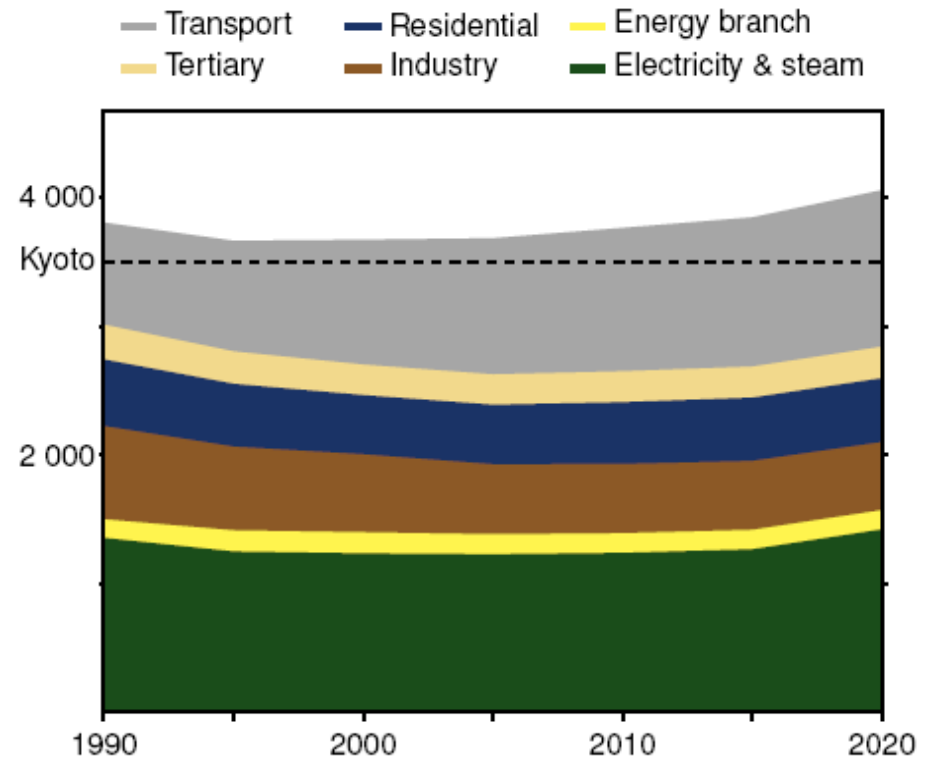
- globalisation
- liberalisation of markets
- deregulation in road transport



Development of Freight Transport in the EU

Consequences:

- pollution
- increasing fuel costs
- unreliable traffic conditions
- road tolls
- high competition



CO₂ emissions by sector (in 1000 t) in the EU-25

Supply Chain Management

Goals:

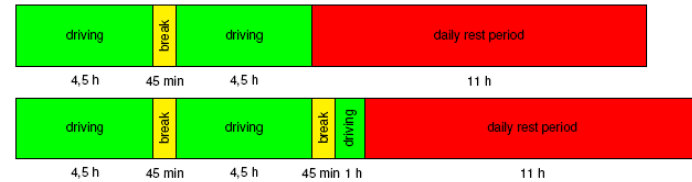
- Reduce stock levels
- Reduce in-transit inventory
- Reduce total lead time
- Reduce lead time variability
- Increase speed of payment

Customer expectations:

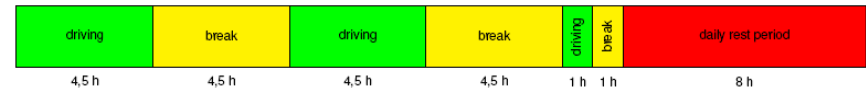
- Punctuality (JIT)
- Transparency (T&T, POD, POC, ...)
- Reliability
- Flexibility

Drivers' Working Hours

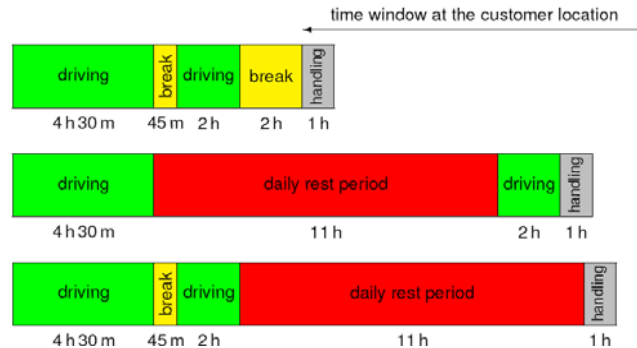
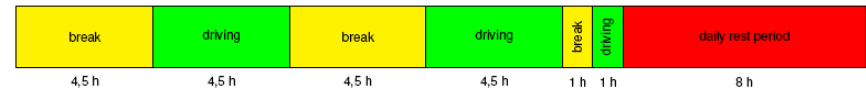
- New EU regulations
- Carriers are responsible
- Significant impact on total travel times
- Increased complexity



Driver 1:



Driver 2:



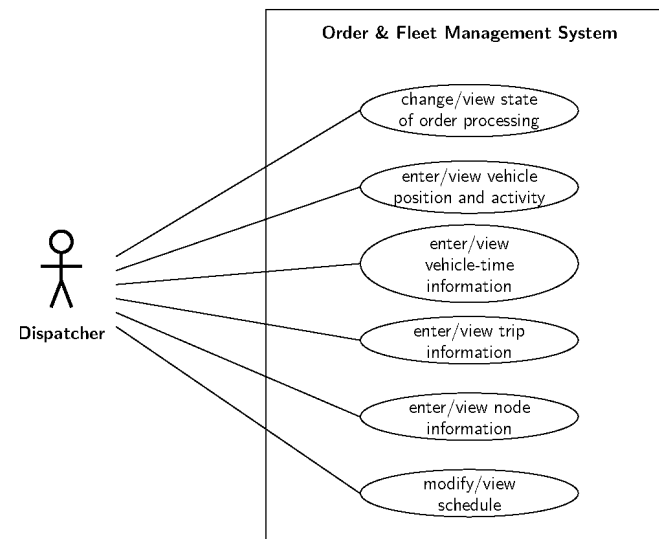
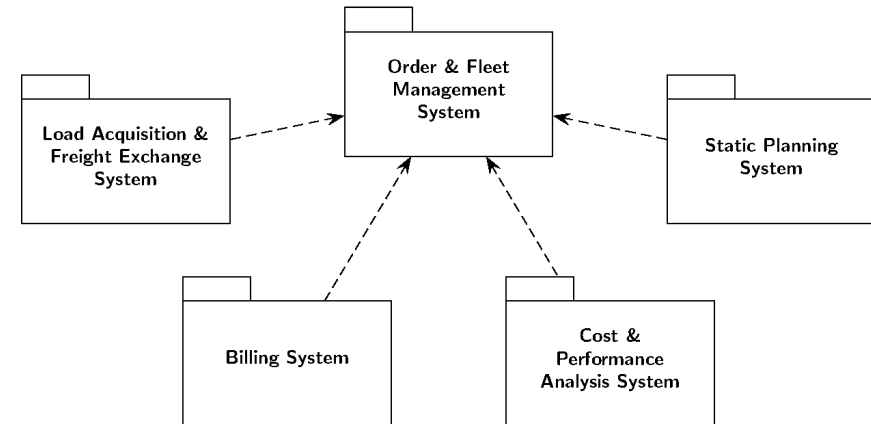
Overcome Requirements of Modern Transport

- Improve intra- and inter-organisational information flow
- Create real-time decision making capabilities
- Provide real-time decision support



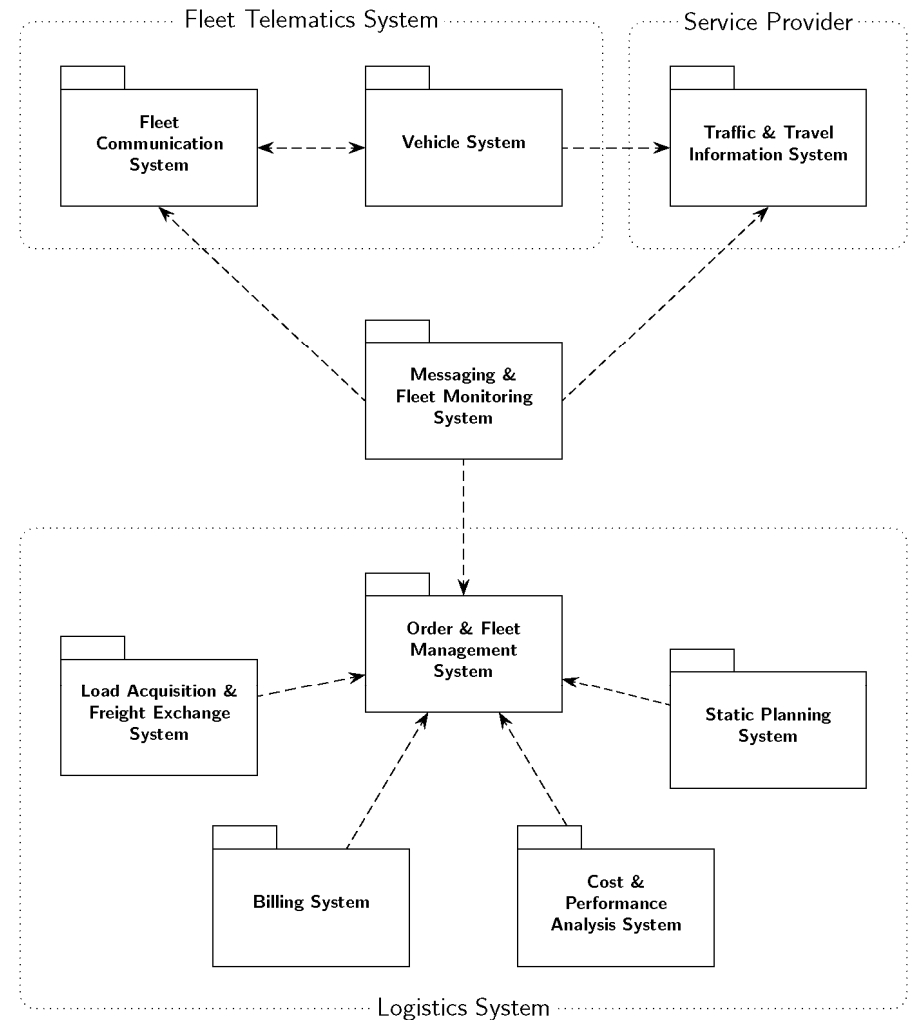
A typical legacy Logistics System

- Order & Fleet Management System
 - central role concerning the management of orders and vehicles
 - bidirectional interfaces allow other subsystems to connect
 - usually collaboratively used by several dispatchers
- Usually no interfaces to Fleet Telematics Systems!
- Replacement of legacy systems is costly and risky!



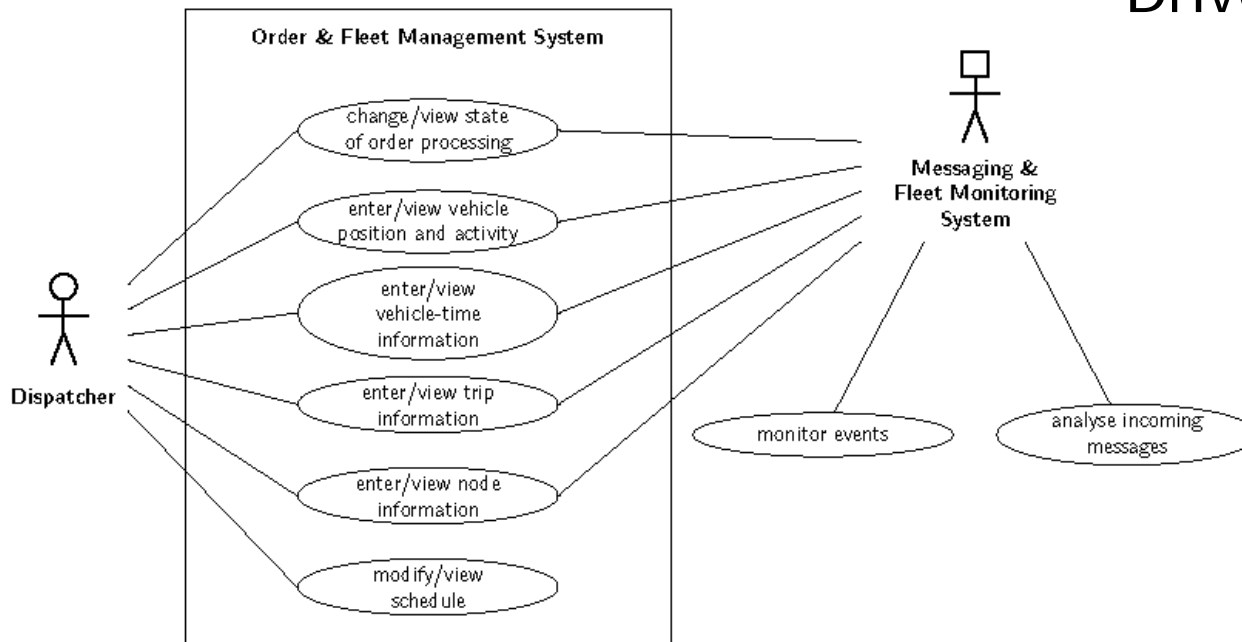
Telematics-enabled Information System

- Limited benefits without integration of telematics!
- Messaging & Fleet Monitoring System
 - integrate Logistics System and Fleet Telematics System
 - reduce duplicate data
 - reduce error-prone manual transfer of data
 - automatically convert data into useful information



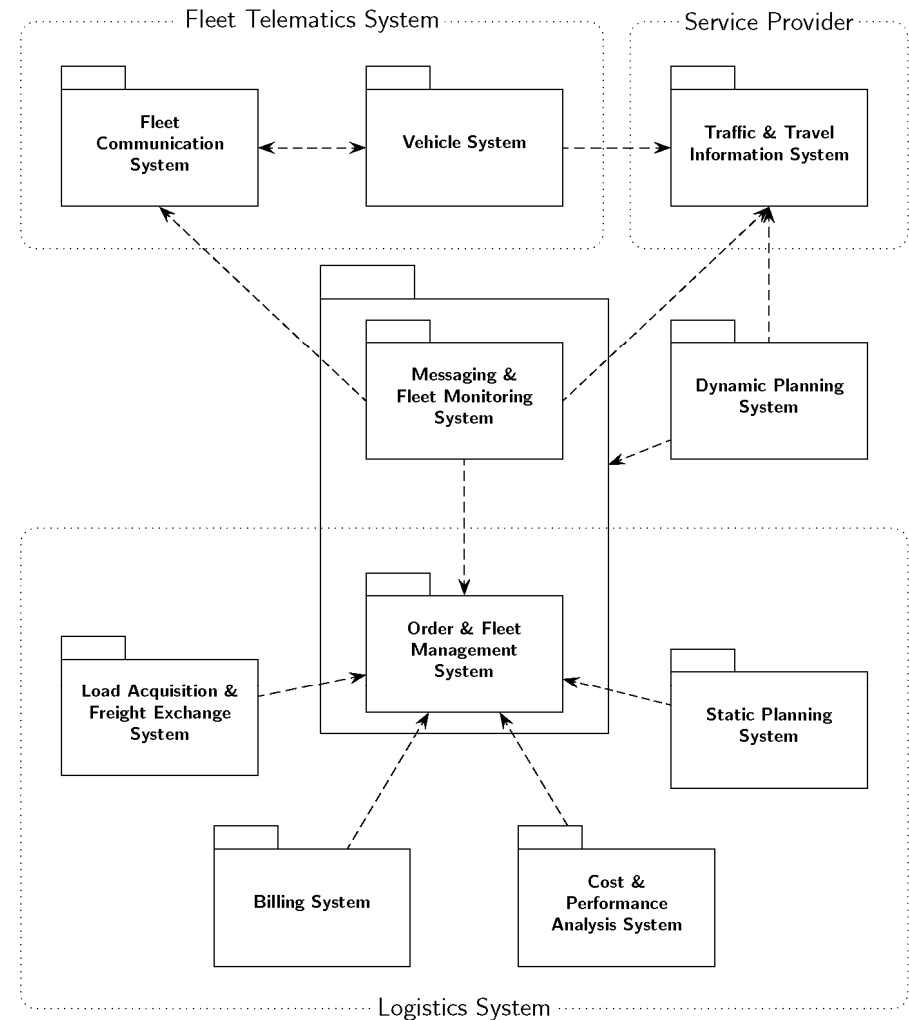
Messaging & Fleet Monitoring System

- Analyse messages
- Compare actual and planned data
- Revise planned data
- Geofencing
- Incidents & events
- Arrival & departure times
- Actual route & costs
- Drivers' working hours



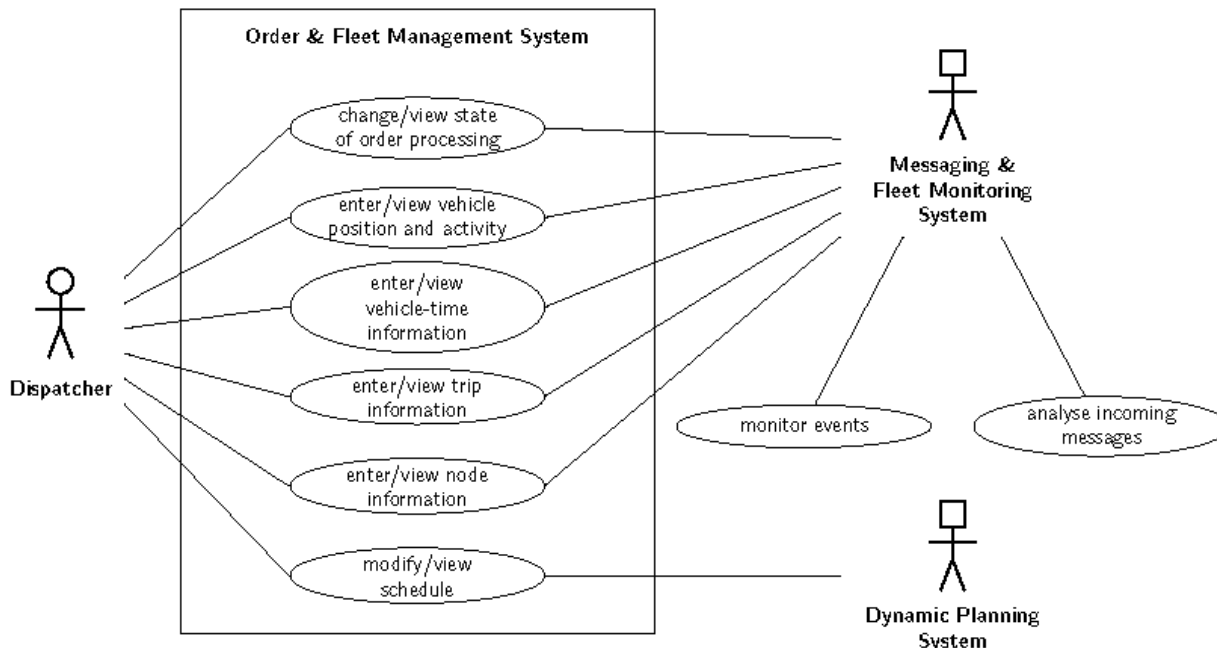
Real-time Decision Support

- MFMS provides timely and reliable information
- MFMS enables real-time decision support
- Dynamic Planning System
 - optimises schedules considering the current state of the transportation system



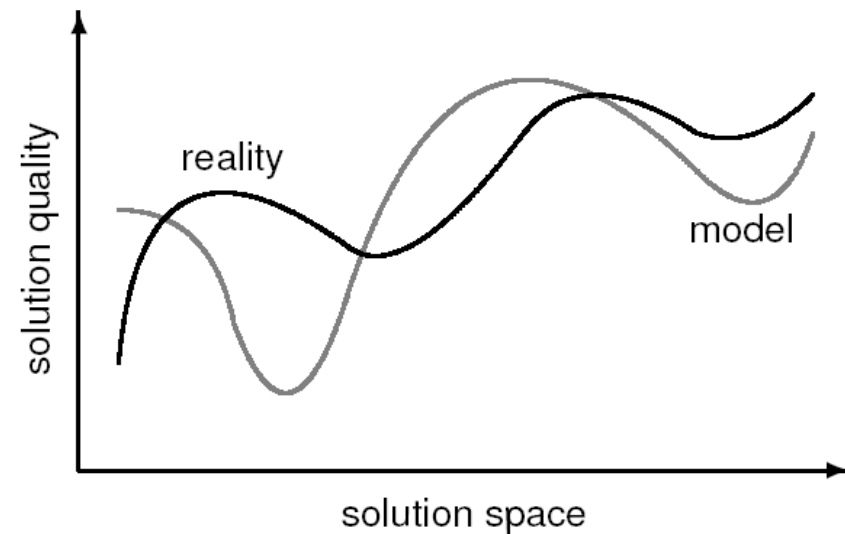
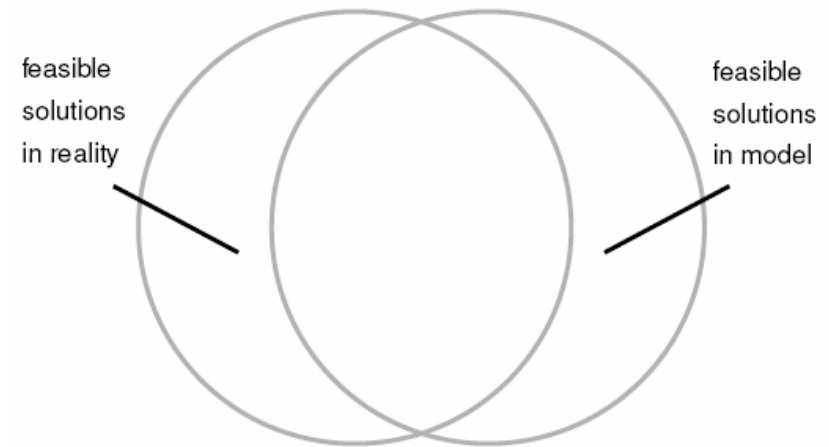
Collaborative Problem Solving

- Several actors concurrently and collaboratively modify problem and solution
- Specific strengths of the actors are combined
 - different problem knowledge
 - different solution techniques



Modelling of Real-life Problems

- Computer-based decision support requires a model representation of the reality
- Effectiveness depends on gap between model representation and reality
- Little time to manually resolve infeasibilities in real-time



Dynamic Vehicle Routing

Dynamic Data:

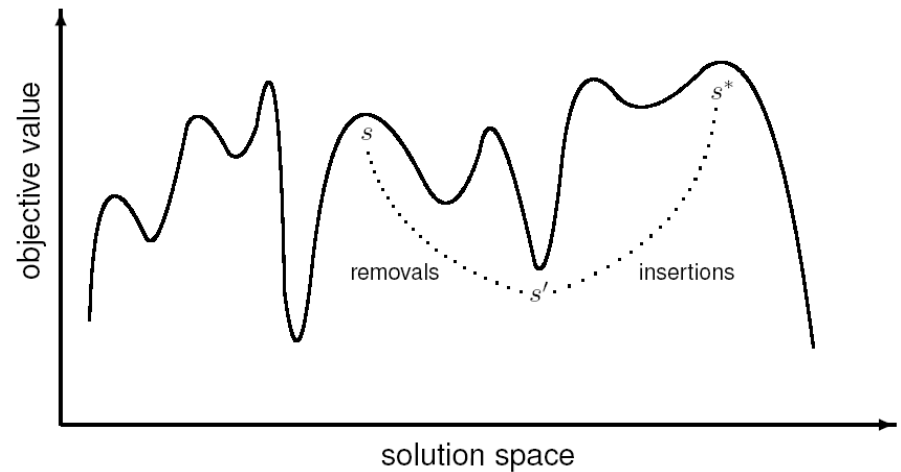
- New orders
- Vehicle position
- Driver state
- Traffic conditions

Decisions in real-time:

- Load acceptance
- Load-Driver assignments
- Routing

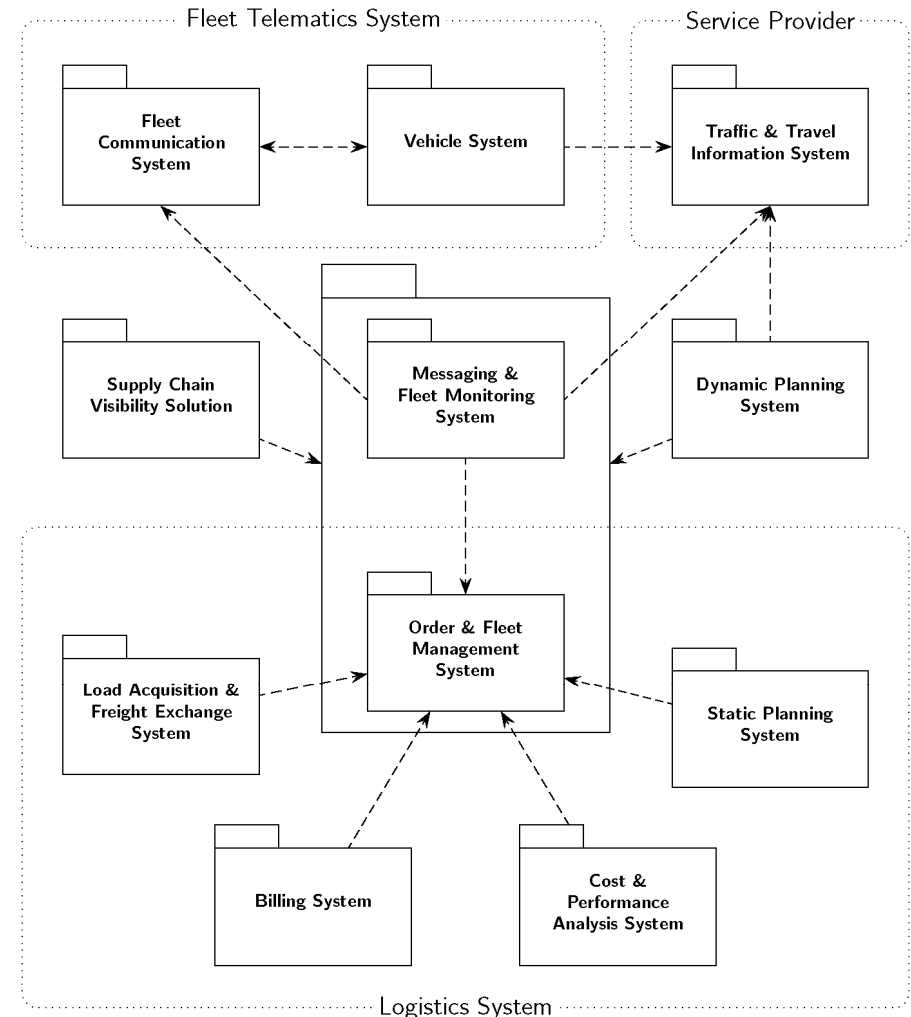
Large Neighbourhood Search:

- Suitable for rich models
- Fast response times
- Ruin & recreate principle



Supply Chain Visibility

- Integrated logistics and telematics systems improves transparency
- Dynamic optimisation increases efficiency and flexibility
- Visibility solution improves performance and agility of the entire supply chain



Supply Chain Visibility

Telematics-enabled visibility creates value at different levels:

- Level 1: Tracking & tracing →
- Identify incidents
 - Measure supply chain performance
 - Increase confidence in the supply chain
- Level 2: Update shipment plan and *Estimated Time of Arrival* →
- Alert customers
 - Allocate in-transit inventory to customer
- Level 3: Influence transport management in process →
- Optimise the total supply chain
 - Minimise total landed costs

Thank you for your attention!

Q & A