Simulation for Logistics

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Logistics: transportation, storage,…

- Space
- Time
- Uncertainty
  - Delivery time
  - Failures
  - Causal dependences
- Large number of parameters
  - When, where
  - Auto/Rail/Sea
  - Own/Rented
- Interaction with other processes
  - Sales/forecast
  - Business-process
  - Production
Resofret: Problem definition

- Checking competitiveness of “auto – rail – auto” transportation scheme against “auto” only
Resofret: Challenges

• Identifying structure of transportation network
  – Number of required terminals
  – Utilization of terminals
  – Parameters of shipments
  – Capacity of segments

• Trains management
  – Restricted by available time slots
  – Trains size
Resofret: Approach

- All requests are split in two:
  - Request goes over auto network
  - Request goes over a combined chain

- Stations, terminals, rail segments are agents
- Implicit simulation of expeditors
Resofret: Results

- Flexible simulation based tool for complex analysis of transportation network
  - Costs adjustment
  - Changes to network structure
  - Different train assembling policies
Port du Havre: Construction of new terminal

- New multimodal terminal supporting containers transfer between rail trains/river barges and sea transport
- Containers are transferred by shuttles, consisting of several rail cars
Port du Havre: Two scenarios

• **Base scenario:**
  – Passive cars driven by locomotives

• **Advanced scenario:**
  – Autonomous cars able to move without locomotives
Port du Havre: Goals of simulation

• Compare scenarios by:
  – Costs
  – QOS

• Identify internal network structure supporting desired throughput of the system