Towards optimimimized city logistics: from person transport to snow plow
City of Pori, Finland

- Pori is the 11th largest city in Finland with approx. 83 200 inhabitants.
- Founded 1558
- The total area of Pori: 1 385 km²
- Streets, total (km): 1 163
- Cycle paths (km): 295
- Total Plowed kilometers: 1 458 km (904 Miles) in winters
I: Background: Why to optimize city logistics?

- In previous years, annual transportation costs have been approx. 10M$ in the city of Pori
- Over 300 own vehicles; from heavy equipment to small cars
- Previous transport delivery solutions have not been efficient enough
- Main problems have been based on the capacity of vehicles and how to fully exploit the capacity of those vehicles
Starting points

- City Board decided: Logistics in our city must be updated and optimized!

- First: Our main job was to update the road network

- Second: Our geographical information system could not manage a network analysis and optimization of logistics

- Third: Every road needed a maintenance classification and as well as the width for snow plow management: from main streets to light traffic routes (ie. bicycle paths).
The steps and tools

- The job was carried out using ArcGIS
- The whole city area was divided into 1 km² grids
- There was over 800 grids to check
- Over 1400 kilometers of roads to update
- The result: City wide updated road network with maintenance categories and topologies for snow plow and transport optimization
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optimization targets:

- Street Maintenance
- School Transport
- Catering Transport
- Small Goods Transport
- Disability Transport
- Elderly Transportation
- Home Hospital Services
- Public Transport
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Now implemented or in progress

- Small Goods Transport
  - Result: 50 percent less vehicles do the same job now without delay

- Catering transport:
  - Result: Over 50 percent less vehicles deliver meal without delay

- Personal transport:
  - By combining special students transport and disabled transport
    - 27 percent less kilometers vs. non-optimized transport!
Summa Summarum: Possibilities in Optimized City Logistics

- Shorter routes
- Lower fuel costs
- Better utilization of vehicles
  - Less vehicles needed
- Lower costs in Planning and Administration
- Employees' workload is falling
  - More time for customer service

- In most cases, the real potential for savings is about 20% or more
II: State of the Art Snow Plow GP-model

- The Model is based on:
  - Street Maintenance Classification Priority
  - Plowing Vehicle
  - Driving Speed
  - Number of Plowing Areas

- Model’s been built using:
  - ArcGIS NetWork Analyst VRP-solver and Geoprosessing
  - Built in collaboration with ESRI Finland’s Analysis Team and City of Pori

- The First Application only for Snow Plow Optimization purpose in Finland or maybe in whole Scandinavia
Consists of three parts:

1. Building the Service Areas
2. Creating Demand Points and Routes
3. Identifying Routes to Plow
The Result: Animation of Finished Model
Thank You!

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