anyLogistix

Transportation optimization

Optimize | Design | Experiment | Innovate

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Webinar Agenda

- Transportation challenges
- Routes Optimization
  - Milk Runs
  - Experiment settings
- Transportation System Simulation
  - Service level influence
  - Fleet size
  - Capacity utilization
- Summary
- Q&A session

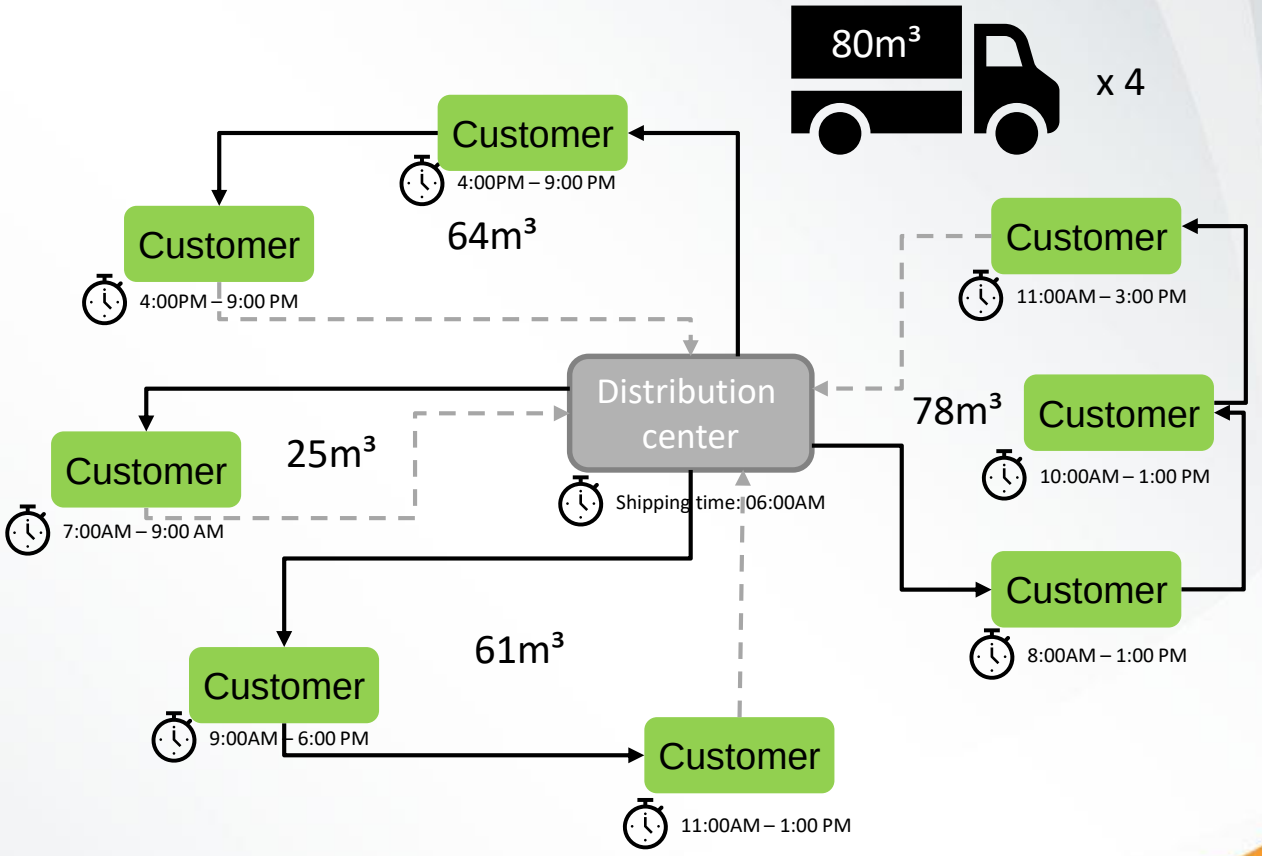
Transportation Challenges

- How to organize the transportation system? How should it work?
- What are the optimal routes?
- Which resources do we need to run transportation system?
  - Fleet, capacity, drivers, shifts…
- How to improve the efficiency of existing transportation system?
- What is the service level we will be able to provide to the customers?
- What is the cost of transportation system? How to cut it?
- How the transportation system influence the rest of the supply chain?
- What if we introduce innovation in the transportation system?
- How the real world stochastic effect the transportation?
- …

Routes Optimization

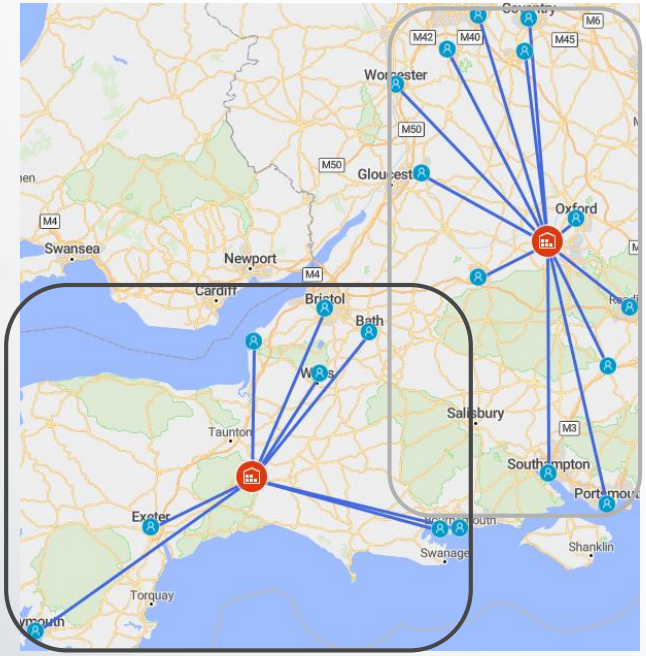
Routes optimization (Milk Runs)

- Identifying routes that can increase truck utilization and reduce logistics costs
- Restrictions:
  - No restrictions
  - Fleet restrictions
    - *Fleet size*
    - *Vehicle capacity*
  - Time windows



Transportation Optimization (TO) Experiment

- Finds an optimal set of routes (milk runs)
  - Independent solution for each Site and Vehicle type
  - If vehicle type is not specified – default one is used



Vehicle types

#	Name	Capacity	Capacity Unit	Speed	Speed Unit
	Filter	Filter	Filter	Filter	Filter
1	Reefer 1	35	m³	Triangular(40;80;50)	km/h
2	Reefer 2	27	m³	Triangular(40;80;50)	km/h
3	Reefer 3	15	m³	Triangular(40;80;50)	km/h

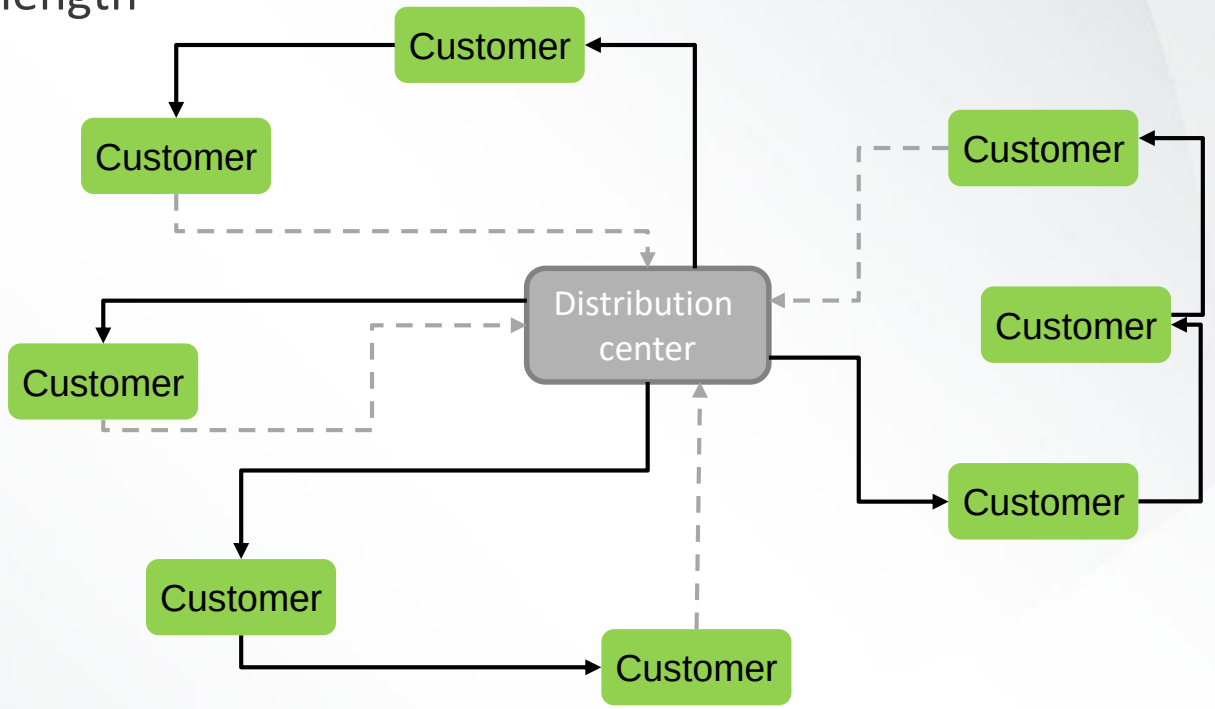
Site 1, Reefer 1 –> Set of routes 1
Site 1, Reefer 2 –> Set of routes 2
Site 1, Reefer 3 –> Set of routes 3
Site 2, Reefer 1 –> Set of routes 4
Site 2, Reefer 2 –> Set of routes 5
Site 2, Reefer 3 –> Set of routes 6

Transportation Optimization (TO) Experiment

- Finds an optimal set of routes (milk runs)
  - Independent solution for each Site and Vehicle type
  - If vehicle type is not specified – default one is used
- Solves a problem considering the road network or the distance between objects
- Additional (Scenario) constraints:
  - Vehicle type capacity
  - Customer time windows
  - Site earliest shipping time
  - Full truck load coefficient

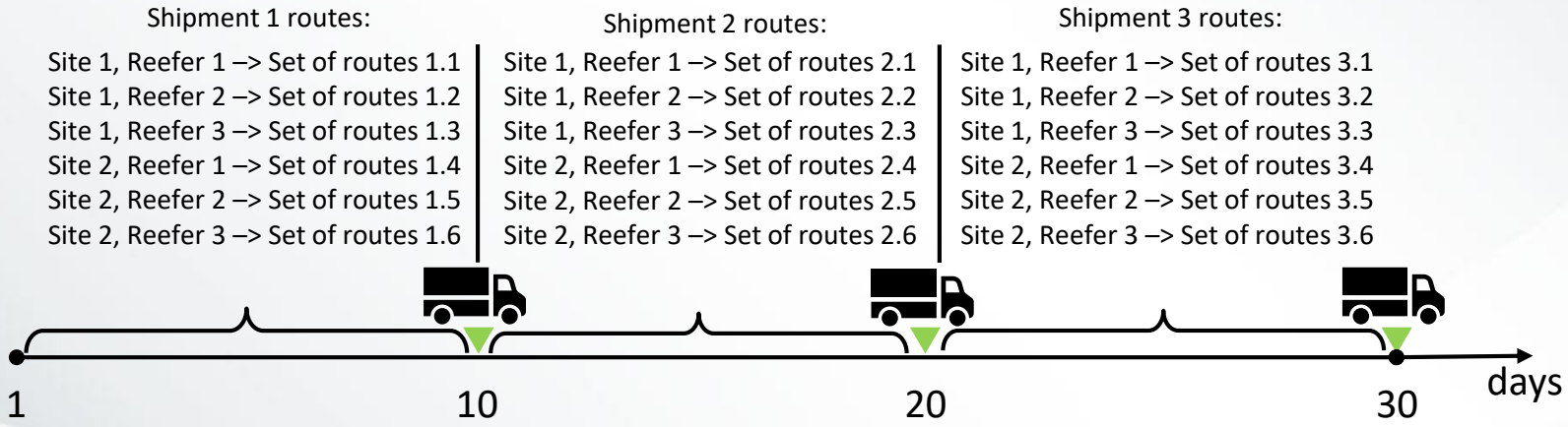
TO Experiment Settings

- User restrictions
  - Max amount of customers on a route
  - Max segment length between objects
  - Returning segment length



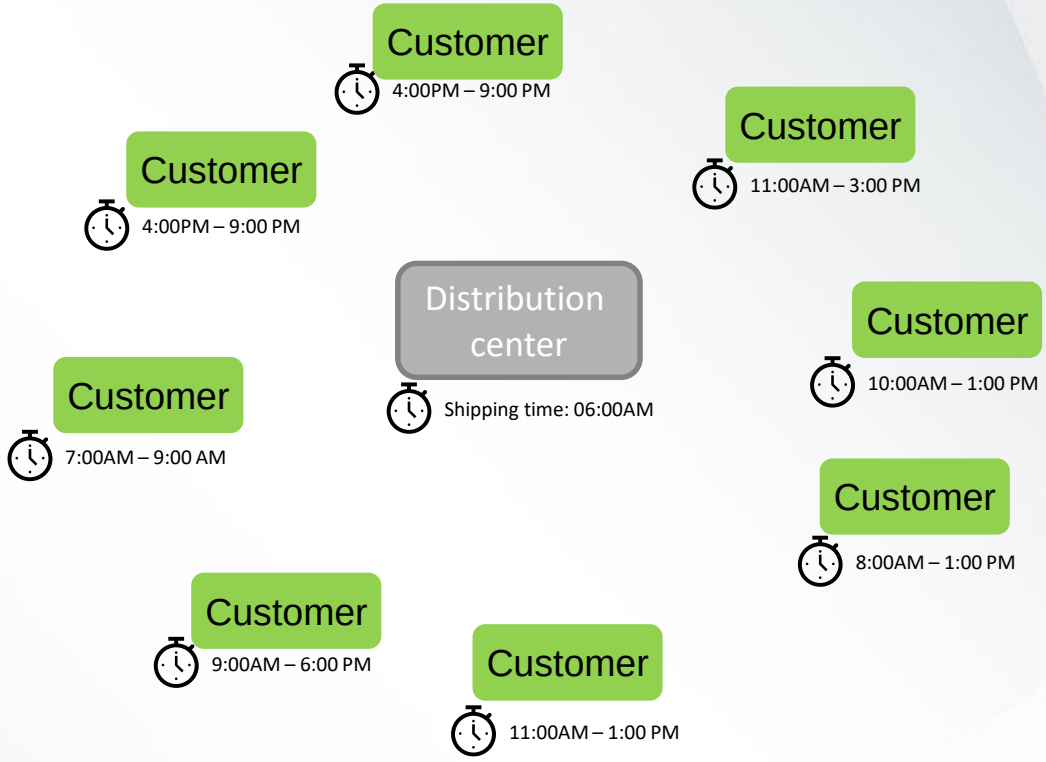
TO Experiment Settings: Shipment

- Observation period: 1 month (30 days)
- Shipments are delivered every 10 days
  - Observation period is divided into 3 intervals
- Demand is aggregated for each of intervals
- Each 10 days shipment with aggregated customers demand is delivered
- Experiment will find independent solutions for each Site, Vehicle type and Shipment



Demo 1

- Distribution center
- Clients
- Vehicle capacity: 80 m³
- Fleet size: 4
- Time windows
- Shipment time



Transportation System Simulation

Transportation System Modeling

Analytical model

Supply Chain - ACTUAL

Simulation model

Optimization

…

Transportation system

Time (mean)
Demand
Vehicles (mean speed, volume)
Timings (delivery, processing, …)
~~Transportation logic/processes~~
~~Randomness~~

…

Optimal routes considering:

- Vehicle types
- Capacity
- Time windows

…

Transportation system

Time (dynamics)
Demand
Vehicles (speed, volume)
Timings (delivery, processing, …)
Transportation logic/processes
Randomness

…

Simulation

…

Transportation system

Time (dynamics)
Demand
Vehicles (speed, volume)
Timings (delivery, processing, …)
Transportation logic/processes
Randomness

…

Results

Fleet utilization
Vehicle type utilization
Fleet size
Transportation costs
Service level
…

Demo 2

Summary

- Analytical methods are well equipped to handle large scale transportation optimization problems
  - Routes optimization considering time windows, capacity, fleet size
- Dynamic simulation captures all the specifics of transportation enabling you to measure all the characteristics
  - Fleet size, service level, capacity, utilization, shifts ...
- Analytical and simulation methods complement each other for precise end-to-end supply chain transportation analysis
- anyLogistix combines both methods, allowing you to easily switch from one to another

Upcoming events

April 17-18, 2019 – The AnyLogic Conference - Austin, TX, USA

April 30, 2019 – anyLogistix webinar "Supply Chain Risk Analysis“

May 29-31, 2019 – APAC, seminar and training, Seoul, South Korea

June 11-14, 2019 – anyLogistix seminar and training, Birmingham, UK

June 18, 2019 – Digital Supply Chain Design, Bangalore, India

June 18-20 – anyLogistix training, Bangalore, India

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