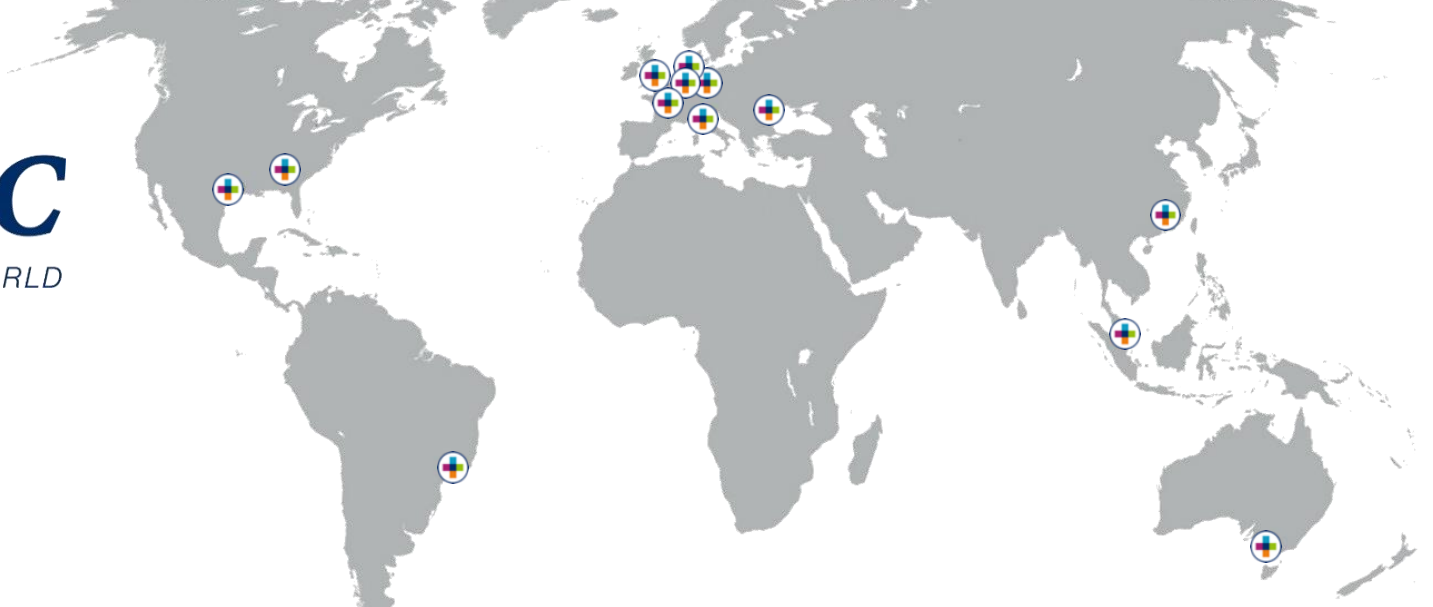


The VeRoLog Solver Challenge 2016-2017



Gerhard Post & Bas den Heijer
Nantes, June 7, 2016





Use algorithms to ***Optimize Your World***

Founded in **1981** in the Netherlands

800+ employees

Offices all over the world

HQ in the Netherlands

VeRoLog Solver Challenge 2016-2017

It is the third VeRoLog Solver Challenge

Organized by VeRoLog and ORTEC

Will run till June 1, 2017

Awarding at VeRoLog 2017 in Amsterdam

Challenge problem resembles Inventory Routing:

- combination of scheduling and routing

Loosely based on a client case (submitted to VRP-REP)

Problem from practice

Routing challenge faced by a herd (cattle) improvement company

Task: regularly measure the quality of milk samples at customers (farmers)

- Multi-day planning
- The farmer can request tools for a number of days
- Time windows on the delivery day of tools



Objects

vehicle

Unlimited amount
Homogeneous fleet

customer
(x,y)

Requests tools
Several requests are possible

depot

Routes (per day) start and end here
All tools are here at start and end of the horizon

tool

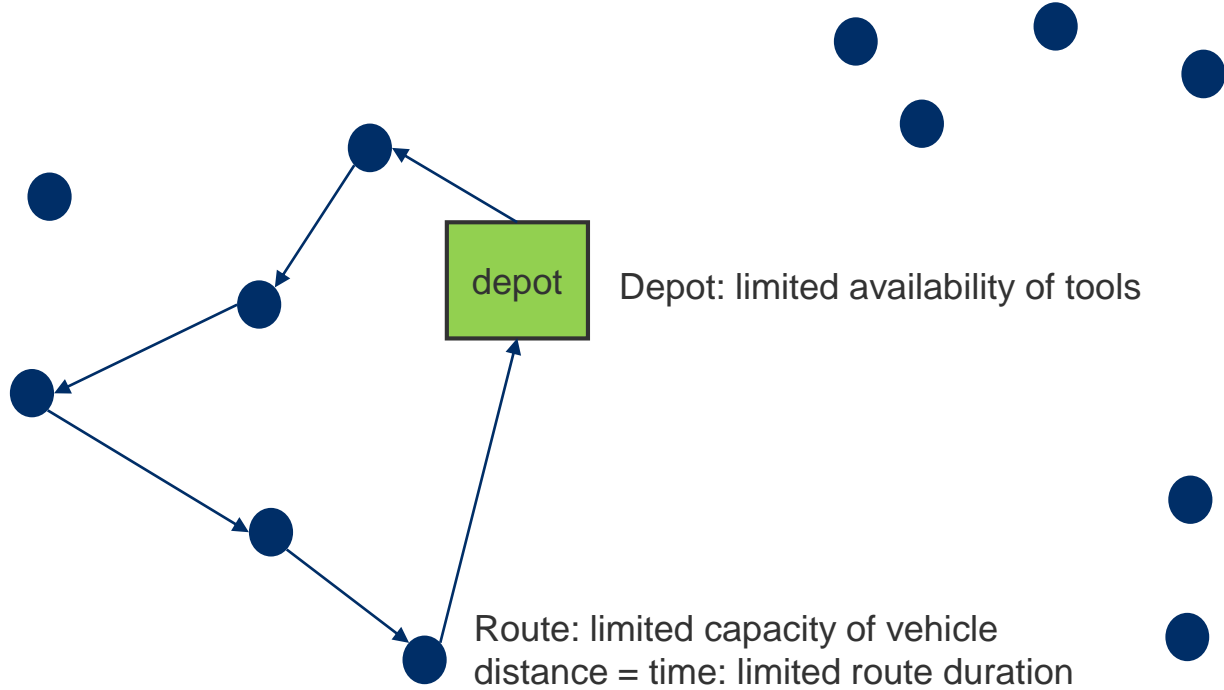


Request: a customer requests tools of one tool kind for a number of days with a time window for **delivery**.

Pickup of the tools: the day after the request period finished

Constraints

- Requests: pickup at customer and deliver for a new customer is possible



Objective function

Cost

- number of tools needed in the planning horizon
- number of vehicles needed in the planning horizon
- number of routes (or: vehicles per day)
- distance traveled

Example - first schedule then route (decomposition)

1. Decide on what day to deliver the requests
2. Per day solve a VRP (-UPD)

If the ***tool costs*** are high, then spread the requests over the days

If the ***tool costs*** are low, then cluster the routes geographically within a day

Example data (txt or XML)

DAYS = 50

vehicle

CAPACITY = 6

MAX_TRIP_DISTANCE = 600

VEHICLE_COST = 100000

VEHICLE_DAY_COST = 1000

DISTANCE_COST = 1

cost

TOOLS = 4

1 1 20 50

2 1 20 100

3 2 10 200

4 2 10 300

tools (id, size, number, cost)

COORDINATES = 7

0 10 50

1 20 10

2 50 5

3 33 7

4 40 40

5 70 40

6 1 35

depot and customers

REQUESTS = 6

1 1 1 10 5 1 1

2 2 5 25 3 3 1

3 3 20 30 4 4 2

4 4 25 45 5 1 3

5 5 40 45 2 2 1

6 6 15 30 7 4 1

delivery requests

DAY = 5

NUMBER_OF_VEHICLES = 2

1 R 0 2 3 6 -12 0

2 R 0 -1 7 8 -14 0

solution

Challenge part I “All-time-best”

25 instances are disclosed in October 2016 (“early instances”)

Participants can send in best solutions per instance

The (objective value of) best results will be published on the website

The best results per instances are awarded

There is no restriction on time or resources

Challenge part II “Traditional”

Instances are disclosed in February 2017 (“late instances”)

Limitation on CPU time and resources (only free external solvers allowed)

After May 1, 2017 around 5 participants are selected as finalists

The *organization* runs the finalists’ solvers on hidden instances

The solver with lowest mean rank wins the competition



VeRoLog solver challenge

2016-2017

Downloads

- Introduction of the challenge
- The Set-up of the challenge

Time line

