

Case Study

Route Optimization for Fresh
Product Delivery

Introduction

For privacy reasons, the data shared in this case study was artificially generated to represent the typical activity of a wholesaler making deliveries in Paris. The optimization results and the improvements are representative of what we have actually been able to obtain from several players in this industry.



Scope of Analysis

- Wholesaler located in Rungis
- Deliveries of fresh products to restaurants, caterers and traders
- Deliveries inner Paris
- 12 vehicles
- 210 deliveries per day on average



Constraints of Route Optimization

- Customers are recurring, but volumes vary from day to day
- Deliveries are made by refrigerated truck (total weight: 3.5t.) only
- Routes start between 3 a.m. and 5 a.m., to deliver customers before opening, and must end before 11:30 a.m.
- Some restaurateurs impose delivery frequencies and schedules
- Some restaurants allow drop-off before opening
- The duration of a delivery is variable and depends on the quantity to be delivered (between 5 and 20 minutes)



Route Performance Before Optimization



Mapping of deliveries to be made in intramural Paris

- Days studied: **5**
- Number of vehicles used: **11,4 (average)**
- Deliveries made: **207 (average)**
- Productivity: **18.2 orders / driver**
- Time slots success: **76%**
- Kilometers traveled: **5 139 km**
- Estimated OPEX cost: **25,5k€**
(based on a cost model that takes into account an hourly and kilometer cost)

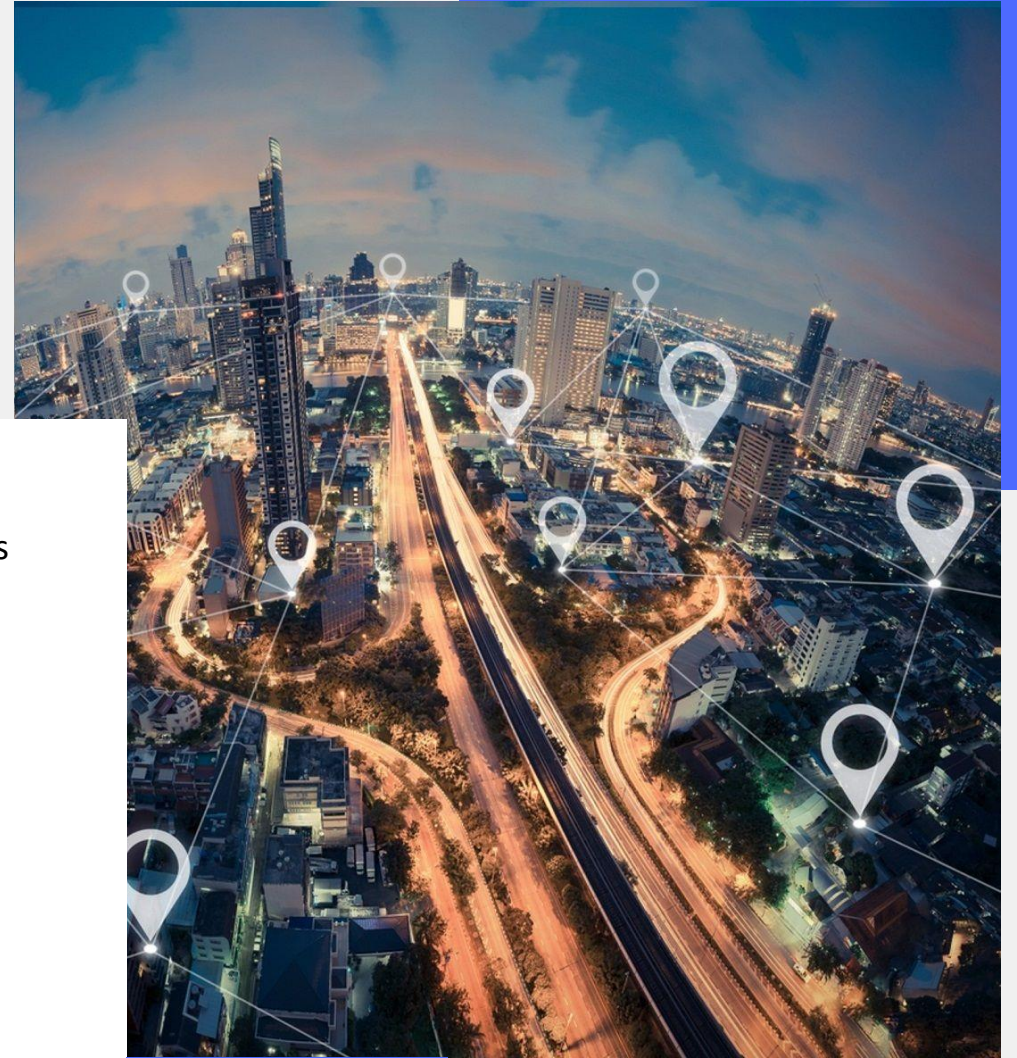


Kardinal Route Optimization

To optimize the routes on the day in question, the Kardinal algorithm was set to minimize the following criteria with priority:

- 1. DELAYS**
- 2. NUMBER OF VEHICLES USED:**
- 3. TOTAL TIME SPENT ON THE ROAD**

Prioritizing the criteria makes it possible to reflect business priorities: here, quality of service comes first.



Optimization Results



+30% ON DELIVERING IN DEFINED TIME SLOTS

98.6% of time slots respected with Kardinal optimization versus 76% previously.



+22.9% INCREASE IN PRODUCTIVITY

The number of daily deliveries per driver has increased from 18.6 to 21.6.



-15.4% ON THE NUMBER OF VEHICLES USED

The average number of vehicles used per day decreased from 11.4 to 9.6.



-17.4% ON OPEX COSTS

The average daily operating costs went from € 5,000 to € 4,260 with optimization.

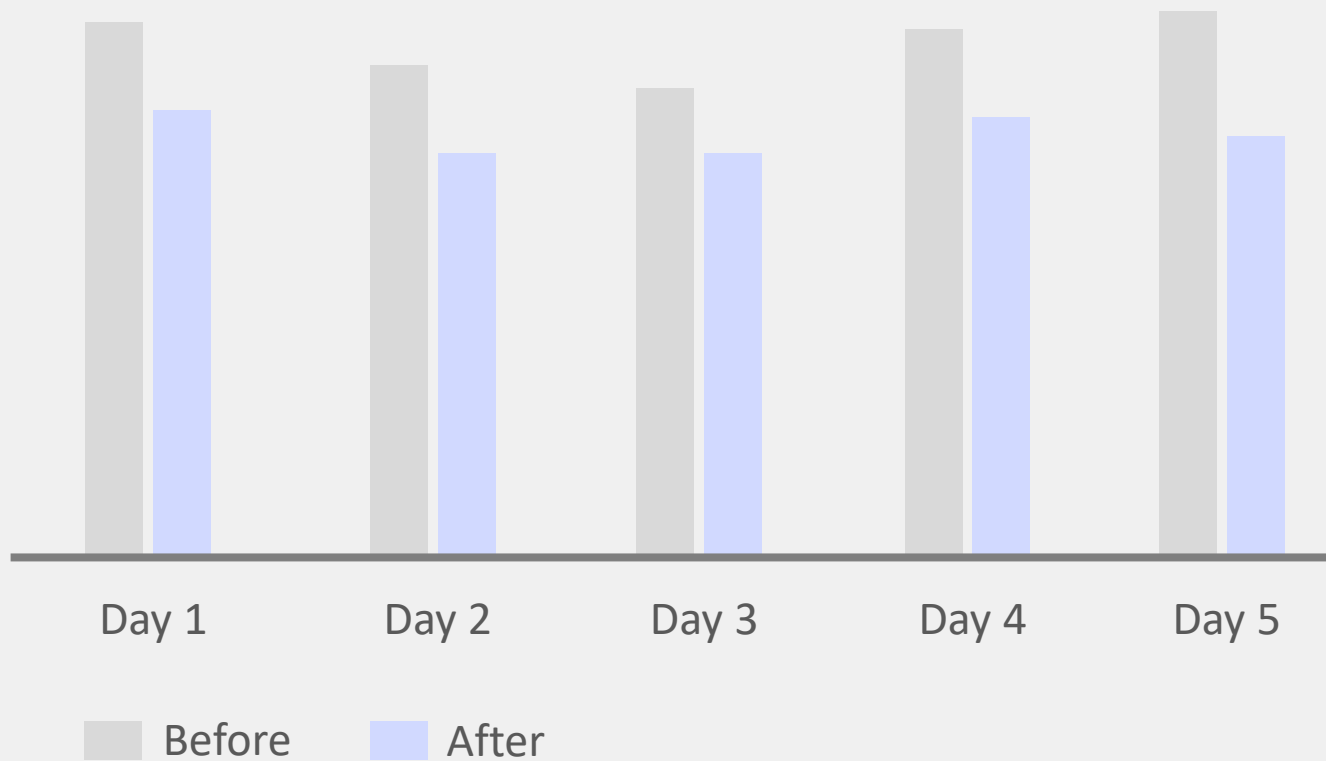


-11.2% ON THE NUMBER OF KILOMETERS TRAVELED

4,564 km traveled by the fleet versus 5,139 previously.



Results



- The decrease in OPEX costs is about the same in proportion, regardless of the optimized day, including Friday deliveries, which are particularly numerous in anticipation of the weekend.
- This constant level of performance reassured the company in its capacity to be able to generalize the approach to all of its activity.



Example of optimized routes

Route of a delivery man who generally made his deliveries in the 15th arrondissement of Paris only.

Here, the algorithm takes the driver through 4 arrondissements, on a route that starts at 3am, to deliver the most restrictive customers in terms of openness. In this way, the algorithm uses a route dedicated to deliveries to be made early to release the pressure on the other routes which therefore become more productive.



Conclusion



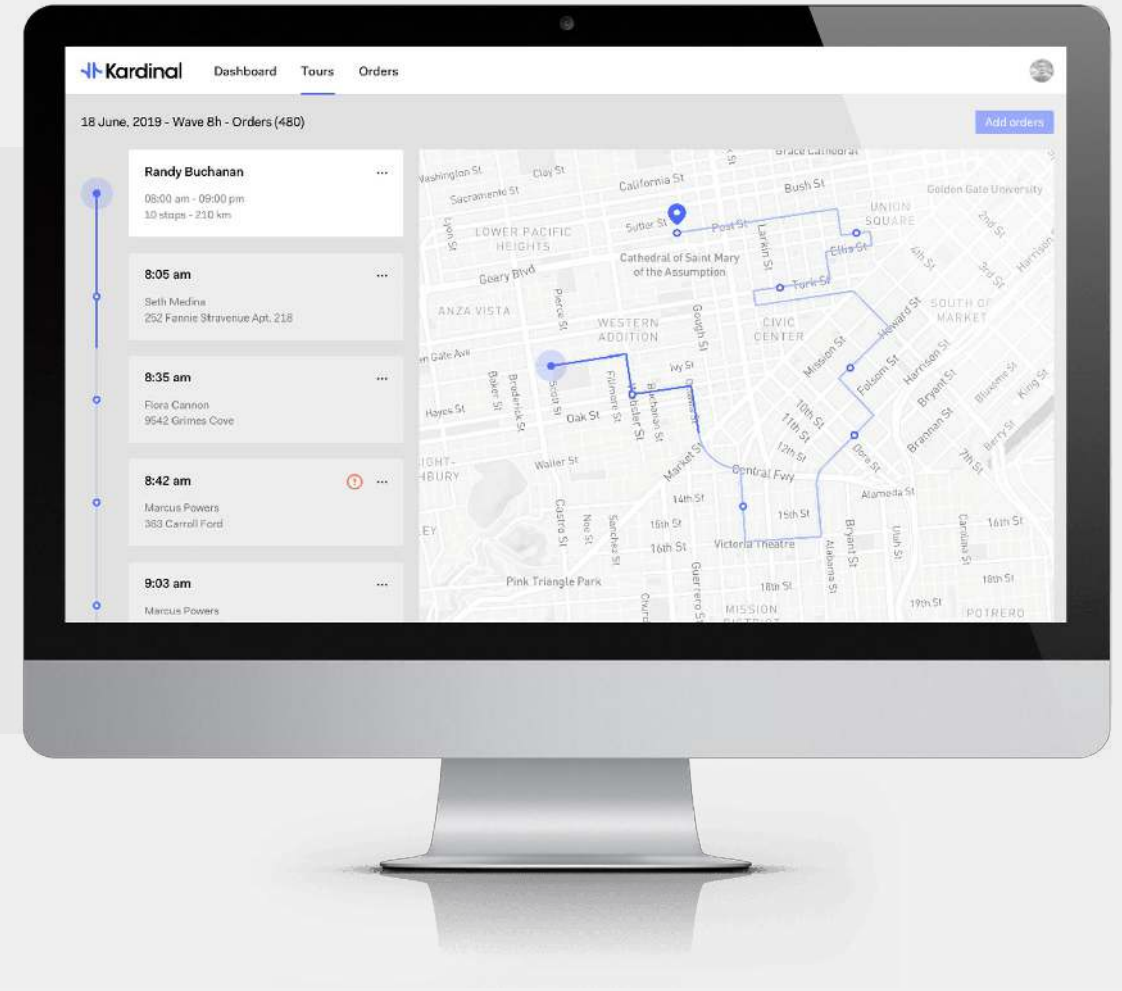
- Estimated increased earnings over the year for the delivery inner Paris at more than €200,000.
- Increased customer satisfaction thanks to delivering in defined time slots;
- Less time spent on the road and less stress for planners and drivers.



About Kardinal

Kardinal is a software company that supports carriers in the digitalization and optimization of their transport operations.

Using artificial intelligence, Kardinal provides its customers with innovative solutions dedicated to optimizing operational performance for more efficient, agile and sustainable logistics.



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