



# Change your logistics game with optimization

In an industry that moves at lightning speed, the optimal solution at the right time — every time — puts you miles ahead of the competition

OPTIMIZATION





### OPTIMIZATION

The world of logistics is more volatile, precarious and competitive than ever before. And all signs indicate that this will only intensify.

Trucking companies in the United States are fraught with tepid demand, falling volumes and plunging prices.<sup>1</sup> The intermodal market is sluggish as international shipping volumes are wildly fluctuating.<sup>2</sup> The industry as a whole is also experiencing rapid swings in customer demand and input factors such as fuel.<sup>3</sup>

Leading logistics players are struggling to keep up — to satisfy an increasingly insatiable market while remaining profitable. Despite their best efforts and best planning methods, however, research shows that money is still being left on the table. In a landscape characterized by such volatility, complexity and speed, the impact of sub-optimal decisions made every day is great. Their resulting impact on the bottom line is significant and if left unaddressed, irreparable.

Experts say that the best defense in the face of sudden change is agility, but agility takes on different meanings at different levels. When it comes to day of operations, the decisions you make must be fast, accurate, satisfy all business KPIs and take rules and constraints into account — all at the same time. In other words, decisions made on the day of operations must be optimal.

Optimization technology that can balance these variables simultaneously — and deliver the highest quality solution right at the moment it is needed — is the key to a lasting competitive advantage.

In this solution paper, you will discover:

- The importance and possible impact of optimization
- The hallmarks of a game-changing optimizer
- How you can harness optimization to transform your operations



[1] Trucking Companies Pare Down Their Fleets Amid Tepid Shipping Demand (Wall Street Journal, 2016)

[2] Rail/Intermodal Roundtable: Getting Back on Track (Logistics Management, 2016)

[3] Pathway to value creation (McKinsey & Company, 2015)

# Optimization moves you from good enough to great

Optimization significantly improves the quality of your plans, far beyond what is possible with manual planning. It helps you find the best result among a large set of results — it determines the right combination of resources, chooses the best pickup and delivery sequence, decides on the correct orders to outsource or selects the most efficient route for each shipment through your network.

That being said, not all optimization solutions are created equal. Optimization is, in most cases, a trade-off between the amount of computational time invested and the quality of the solution obtained. Prioritizing speed over quality gives short-term results that look good on paper, but ends up jeopardizing your bottom line in the long run. Conversely, prioritizing quality over speed leads to solutions that may benefit your bottom line, but ultimately fail to do so because they came in too late. This translates into missed opportunity for profit and cost-savings. The longer it takes to obtain a quality solution, the more money you end up losing.

While speed and quality are critical, true optimization goes beyond merely striking a balance between the two. True optimization delivers an overall solution that is of a higher quality within a shorter period of time. It benefits your organization across all planning horizons, at all times. In fact, true optimization has proven to improve bottom lines by as much as 10% to 20%.

Because every logistics planning scenario presents a staggering number of possible solutions, the benefits of applying optimization in logistics is particularly significant. Algorithms in the optimizer help you find the best solution while taking into account all constraints as well as profit margins, cost and customer service levels. With the touch of a button, in mere minutes, the optimizer is able to present a high quality solution that enables you to slash costs by reducing the number of routes, total distance traveled by vehicles in your fleet, empty repositioning and modality choices.

Speed is critical, especially when disruptions hit. Plans that have taken your planners weeks to create can unravel within minutes. Even the best planners — as talented and experienced as they may be — will not be able to re-plan within an acceptable timeframe, let alone on the day of operations. An optimizer can do just that — in seconds.

# Quality and speed — the hallmarks of a truly outstanding optimizer

In this paper, we established that quality and speed are two characteristics of an optimal solution to a logistics problem. But how is an optimizer able to deliver such a solution? What approach does it take to deliver a great solution right when it is needed?

The answer can be found by looking at the Quintiq optimizer, which has transformed the operations of the biggest logistics companies in the world. By using a specialized search strategy, it delivers optimal solutions that reduce costs, increase efficiency and improve delivery performance. Here is how it works:

## **The optimizer adapts as it searches**

The Quintiq optimizer takes the Adaptive Large Neighborhood Search (ALNS) approach that is well suited to optimization problems that are very large, highly complex and tightly constrained. It has proven to deliver outstanding results for complex industry puzzles with shipments and vehicles numbering in the thousands.

What makes the Quintiq optimizer superior in the market is its adaptive search strategy. This strategy enables the optimizer to solve different puzzles for different companies, from those with homogenous fleets and flexible delivery time windows to those with diverse fleets and strict delivery time windows.

Using this adaptive strategy, the Quintiq optimizer is able to evolve its search based on different priorities at different stages of the optimization process. It automatically adjusts and recalculates search priorities as it progresses step-by-step toward an optimal solution. Here is an example: In the early stages of optimization, the optimizer may prioritize the reduction of overall distance traveled. At a later stage, to refine its search, it may shift its priority to the timeliness of shipments. As the quality of the solution improves, the optimizer adjusts its priorities.

Performing in parallel to the optimizer's adaptive search strategy is its repeated attempts to improve the current solution. It does this by un-planning and re-planning parts of the current solution to produce a better one. In logistics, this is essentially the resequencing of shipments to reach the best and timeliest solution. The Quintiq optimizer may cancel certain shipments, remove some from the schedule or insert some back into the schedule on a different and potentially more profitable time window than before. These small modifications happen automatically, rapidly and repeatedly until the optimizer arrives at the best solution possible.

Using the proven ALNS approach, the Quintiq optimizer is able to deliver an optimal solution in a matter of seconds. The final solution is accepted on the condition that it lowers costs, increases profitability and satisfies all constraints unique to your logistics operations.

**The optimizer learns from real-world data**

The self-learning capability embedded in the optimizer learns from previous results on real-world data to continue refining its search strategy. The optimizer will automatically adjust its search strategy as the characteristics of the planning puzzle change. This built-in capability enables it to deliver the best possible solutions even as business problems, needs and priorities evolve over time.

**The optimizer integrates theory and practice**

Integration of theory and practice — this is the key behind the Quintiq optimizer's impressive performance. Quintiq invests aggressively in R&D to uncover search strategies that deliver the best business results. The team's R&D efforts are complemented by the learnings they obtain from implementing the optimizer in various segments in the logistics industry — from freight forwarding to maritime, postal and express to trucking. This has led to continuous improvements in the optimizer's performance and ability to adapt to an increasingly wide variety of business processes and requirements. The successful integration of theory and practice has resulted not only in an optimizer that has broken some of the toughest optimization puzzles in the world, but has helped leading logistics companies achieve truly remarkable business results.





## When theory is put into practice, real results are achieved

The technology that has smashed optimization records the world over is the same one powering the operations of Quintiq customers. Here are three for whom the Quintiq optimizer has improved operational efficiency, reduced costs and increased business opportunities:

### **DHL Express reduced road mileage by 15%**

DHL Express selected Quintiq to improve its dispatch process and customer service for its European express business. The Quintiq optimizer enabled DHL Express to reduce mileage on the road by 15%. The productivity of dispatch also increased, resulting in a higher number of tours per dispatcher. The elimination of ad hoc tours led to an overall reduction in the number of tours through real-time dispatch. The dispatch application reduced the number of missed pickups significantly, resulting in a higher level of service quality.

### **Czech Post's total distance driven dropped by 10%**

Czech Post is the largest postal and express delivery services operator in the Czech Republic. It processes 7.18 million consignments per day with a fleet of 5,000 vehicles and delivers over 200,000 parcels per day with a fleet of 2,000 vehicles. The Quintiq optimizer enabled Czech Post to reduce its fleet of vehicles' total distance driven by 10%, double the operator's own estimates.

### **ECC slashed operational costs by 12.5%**

Ewals Cargo Care (ECC) operates in 12 European countries and employs 1,600 employees. It serves some of the biggest names in European manufacturing and retail. With Quintiq, ECC has access to real-time information on orders, rides and the use of drivers at any given moment. ECC planners can filter through variables (e.g. material type, route properties, loading and unloading times, truck capacity, etc.) in numerous ways and create various planning scenarios based on these filters. Since adopting Quintiq technology companywide, ECC has seen a 12.5% decrease in its operational costs.

### **Watch the Quintiq optimizer work in your business**

You can perform faster and better than the competition. We will show you how. Using your actual data, we will model your operations to create an optimal plan that works in your reality. See for yourself why Quintiq is the world's leading planning and optimization provider.



**Offices:** [www.quintiq.com/locations](http://www.quintiq.com/locations)

**Email:** [info@quintiq.com](mailto:info@quintiq.com) | **Web:** [www.quintiq.com](http://www.quintiq.com)

