CASE STUDY

Making The Last Mile More Efficient

GUROBI OPTIMIZATION | DELHIVERY Small World

How Delhivery Optimizes Last-Mile Routing for Millions of Packages a Day

These days, people are buying online more than ever before. In 2020 alone, online shopping in the U.S. skyrocketed by 44%. Customer expectations are also on the rise, as people expect purchases to arrive quickly, often in a day or two. And if companies don't deliver on time, the cost is high: when shoppers aren't satisfied with shipping, they often won't buy from a brand again.

> To summarize, Gurobi is convenient and effective. From the proof of concepts we did, it was obviously better than other open-source solvers. We also get great customer support. Even our most technical questions are answered quickly and clearly."

SHASHANK GOYAL
PRINCIPAL DATA SCIENTIST AT DELHIVERY

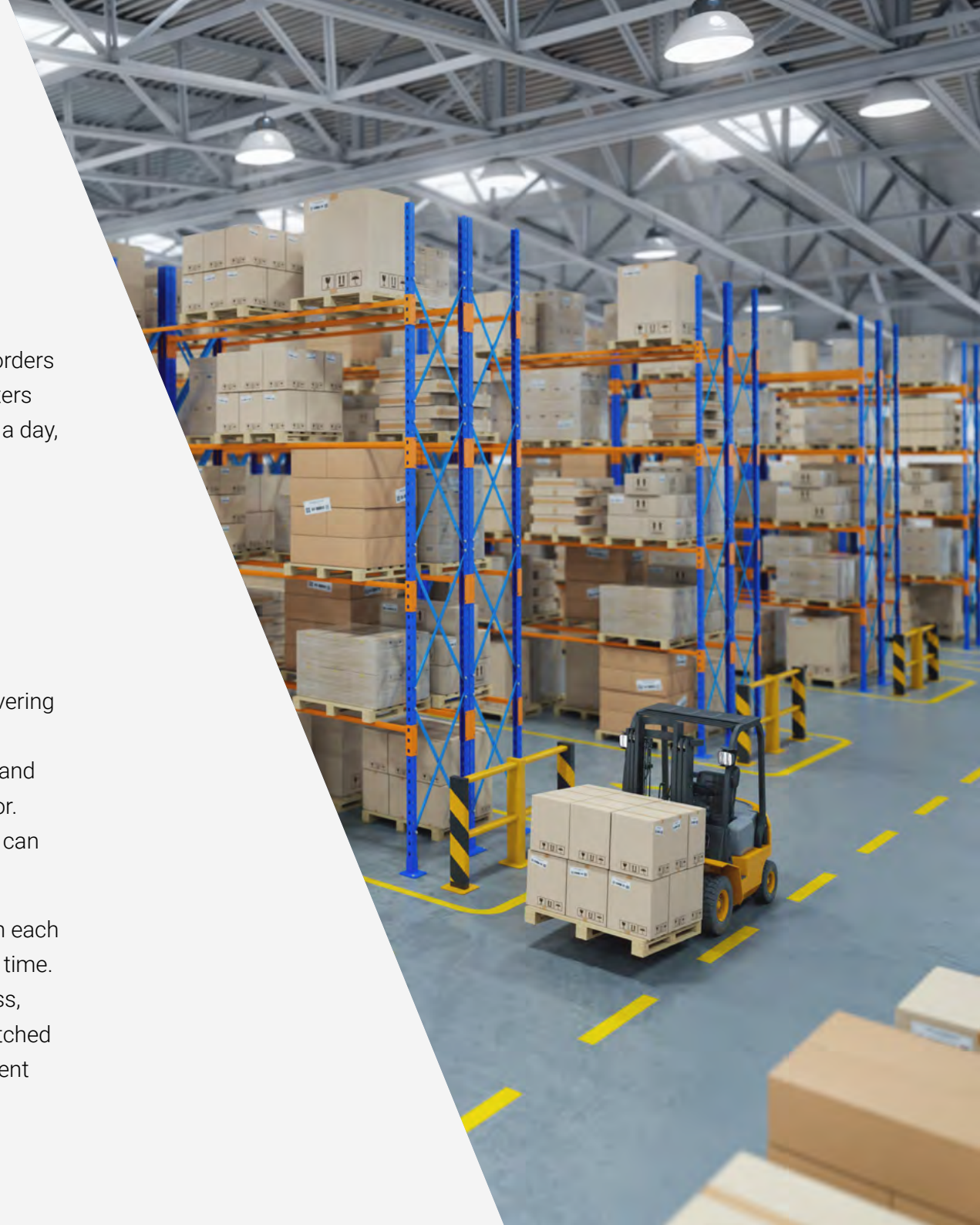
What Delhivery Does

So when it comes to shipping logistics, there's a lot on the line. No one knows this better than logistics expert Delhivery. Since 2011, Delhivery has fulfilled over 1 billion orders across India. They coordinate sorting and distribution centers across the country—making it possible to deliver 24 hours a day, 7 days a week, 365 days a year.

What They Needed

For logistics companies like Delhivery, a key activity is delivering packages the "last mile." This is the final leg of the journey, where a package has arrived at a local dispatching center and needs to be sorted and hand-delivered to a customer's door. According to Business Insider, internationally, the last mile can account for over half of total shipping costs.

That's because it's a complex logistical challenge to assign each package to the right resource to deliver it at the scheduled time. For example, each package has its own destination address, volume, weight, and due date. Packages then must be matched with an available resource to deliver them, each with different vehicles, carrying capacity, and routes.



Finding the Right Solver

For a few years after Delhivery's inception, its personnel at the last mile center sorted packages manually, by reading addresses and grouping them into dispatches. But as the company continued to focus on system direction and building automation across their entire network, they designed and built solutions to automate shipment-to-resource allocation.

Parts of these allocation systems required solving Mixed Integer Linear Programming formulations to power the creation of highly optimized dispatches while respecting multiple constraints and preferences. After testing several open source and commercial solvers, they ended up choosing the Gurobi Optimizer.

"For us, the choice soon became obvious. From the proof of concepts we did, Gurobi was better than the other open-source options we tested," said Shashank Goyal, Principal Data Scientist at Delhivery. "We were also pleased with the prompt customer service from the team at Gurobi."

> "Our internal measures show that we've gained efficiency and are able to allocate shipments to resources in a more meaningful and systematic manner."

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Automating Allocation

Now, Delhivery uses an automatic allocation solution that leverages the Gurobi solver across its distribution centers. It takes them a fraction of the time to match packages with delivery resources. And they can easily account for many hard and soft constraints, including destination, volume, weight, due date, and even a driver's familiarity with a route.

All of this helps them to continue delivering packages on schedule while minimizing costs. "Our internal measures show that we've gained efficiency and are able to allocate shipments to resources in a more meaningful and systematic manner. Now that we have an advanced algorithm in place, we can continue to implement new improvements to our industry-leading solution," said Goyal.

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