



**GUROBI**  
OPTIMIZATION

# LeanLogistics

## Using Gurobi For Better Outcomes

### The Evolving Challenge of Managing Supply Chains

Every day, millions of purchase orders and sales orders are issued between companies. Add to that stock transfers, product returns and any number of other freight movements, and a human planner can quickly become overwhelmed. Just attempting to arrange for the transport of all the associated goods while not violating any number of necessary constraints is exceedingly difficult. Taking all this into account, along with the fact that the cost of transporting freight throughout the world is measured in the trillions of dollars, the companies involved are faced with an incredibly complex set of decisions with significant potential impacts to their bottom line.

For many years, companies have built software to facilitate the planning and execution of these freight movements for manufacturers, distributors, retailers, third party logistics providers, and pretty much anyone who needs to move something from one place to another.

Over time, as companies' supply chains grew increasingly complex, the tools used to facilitate the transportation processes also evolved. They changed from a desktop software model, to a client-server model, to today's push for Software-as-a-Service. Other significant technological shifts have occurred over the last few years as well – pervasive connectivity, cloud computing infrastructure and enterprise-capable online software have changed the landscape dramatically.

### Why We Use Gurobi

LeanLogistics leverages Gurobi as the engine for their LeanSource tool. With Gurobi as the back-end, a major hardware retailer was able to use real-time market information to negotiate better agreements with carriers, saving an average of 12.9% on their annual freight bill.

Gurobi also drives the LeanOpt3 optimization solution for LeanLogistics. Through the use of the optimization capabilities in LeanOpt3, a major food & beverage manufacturer is able to connect plants, warehouses and customer service together with the transportation team and carriers for collaboration on a single platform.

Given the availability of competing solvers on the market, why did LeanLogistics choose Gurobi? The reason is Gurobi's performance in LeanLogistics' benchmark vehicle routing problems is twice that of alternative providers, and it is more scalable; that is, the diminishing returns of making additional hardware available to the solver are encountered at a much higher threshold.

Gurobi's licensing is also simple, flexible, and cost-effective. LeanLogistics is able to license extremely capable hardware for much less than competitive offerings, and it was able to transition those licenses to new machines through the standard hardware refresh cycle.

Finally, Gurobi's support team is excellent. From the day of the first trial to recent inquiries regarding performance tuning and public cloud deployment options, Gurobi leads in this regard. LeanLogistics has won multiple industry awards for their customer support, and Gurobi demonstrates the same level of responsiveness, thoroughness, and product knowledge that LeanLogistics demands from its own customer support representatives.

“Gurobi has it all: performance, price, and personnel. Why would you use anything else?”

— Chris Johnson, VP of Research & Development, LeanLogistics



### The Model

LeanLogistics uses a column-generation based approach to provide near-optimal answers to supply chain problems. Focused on solving incremental linear programming problems that highlight promising routes, large instances of these problems can generate millions of potential columns. Ultimately, a mixed integer programming problem is used to find the optimal subset of routes that ensures shipments are delivered as efficiently as possible.

As a single-instance, multi-tenant SaaS technology provider, LeanLogistics provides their customers with access to reliable, scalable, and substantial computing resources in a cost-effective model. The increasing importance of optimization as part of the solutions they offered required their identifying a partner who could provide a mathematical solver with great performance (especially when run on multi-core infrastructure), a licensing model that made sense for how Lean Logistics sells their product, and a knowledgeable support team that was readily accessible. Gurobi offered all three.