



GUROBI
OPTIMIZATION

Increasing Global Supply Chain Productivity and Profitability

Vestel achieved a 20% improvement in planning accuracy and a 50% reduction in planning time.

VESTEL

Comprised of 24 companies, the Vestel Group is a multi-industry manufacturer, which operates in electronics, household appliances, mobile technologies, LED lighting and defence. Vestel is not only thriving at home in Turkey with its 12 companies, but also through a further 14 businesses that have been set up in various other parts of the world.

Industry: Supply Chain

Location: Europe

Use Cases: Supply Chain, Planning

Website: vestelinternational.com

Results

- 20% improvement in planning accuracy
- 50% reduction in planning time
- 5% reduction in inventory levels

Vestel – an ICRON customer for almost 20 years – is one of Europe's manufacturing giants, specializing in producing consumer electronics, mobile technologies, displays and LED lighting, and household and professional appliances.

In 2011, Vestel decided that it needed an integrated sales and operations planning (S&OP) solution, as the manufacturer's supply chain had become too complex – involving too many products, components, constraints, and constantly changing demand signals – to handle. For this S&OP solution, they turned to ICRON.

The Challenge

Vestel was facing some key challenges, due to the complexities of its supply chain:

- Vestel possesses a wide, diverse product portfolio that changes continually, along with the latest technological advancements and market trends.
- Vestel offers a wide range of customization options to cater to customer demands in terms of order quantity, due date, and product specifications.
- Vestel needed to implement a robust S&OP solution that enabled ongoing responsiveness and seamless collaboration between its Sales & Marketing, Procurement, Manufacturing, and R&D departments.
- Vestel is located far away from its network of suppliers, which are primarily based in Asia.
- Vestel must manage long lead times in material procurement and engender greater integration and flexibility in its S&OP process, to balance supply and demand and reduce costs in this globalized business landscape.

- Vestel executed the S&OP process utilizing numerous interlinked Excel spreadsheets and data extracted from SAP, the company's enterprise resource planning (ERP) system.

Vestel's planning team spent over one year trying to develop their own heuristics-based system to solve these challenges, but they were not successful. To overcome the complexity of their business challenges, Vestel's planners required an automated, optimization-based solution.

They needed an algorithmic planning system that would enable the company to gain greater visibility and flexibility across its supply chain, foster increased integration and collaboration throughout its operations, and boost its overall productivity and profitability.

The Solution

To help Vestel attain a highly flexible, integrated, and automated S&OP process, ICRON's S&OP solution – using Gurobi's mathematical programming solver as its optimization engine – was implemented in 2011 with some customer-specific modeling. ICRON's solution, which was developed, tested, and integrated with Vestel's existing ERP system, was implemented over the course of six months and became immediately fully operational.

The new ICRON system revolutionized and optimized Vestel's S&OP process and empowered its planners by equipping them with enhanced supply chain visibility and the capability to:

- Rapidly generate optimal plans that satisfy sales forecasts and customer demands, minimize production and procurement costs, and meet operational constraints.
- Determine inconsistencies between sales forecasts, realized customer orders, supply constraints, R&D plans, and managerial goals.

Partner Spotlight



ICRON is a leading provider of optimized decision making and supply chain optimization software solutions. Founded in 1992, ICRON helps customers visualize, synchronize, and optimize their end-to-end supply chain operations and enables them to make optimized decisions that improve their productivity and profitability.

Learn more at icrontech.com

- Choose among alternative plans that can satisfy given goals and constraints to increase operational efficiency and reduce costs.
- Perform scenario analysis on forecasts, procurement capability, and production capacity.
- Revise plans automatically to align with realized customer orders and resolve supply and demand imbalances.
- Archive and compare previous plans to facilitate the analysis of discrepancies between forecasts and realized customer orders.
- Develop enhanced data models that enable integration with Vestel's ERP and other data sources.

The Results

Vestel's implementation of ICRON's S&OP solution system and the Gurobi Optimizer delivered:

- **Increased efficiency in the S&OP process:** ICRON reduced the synchronization time between Vestel's sales and operations from two weeks to one day.
- **Greater visibility and control across the supply chain:** Vestel's planning experts are able to present up-to-date and accurate data to all stakeholders in a unified and consistent format.
- **20% improvement in planning accuracy**
- **50% reduction in planning time:** With ICRON, Vestel has been able to cut its planning time by more than 50%, thus significantly increasing its agility by improving its ability to respond to unforeseen changes in demand, supply, or market conditions.
- **5% reduction in inventory levels:** ICRON has enabled Vestel to decrease its inventory levels – for the materials controlled by the ICRON platform – by 5%.

Why did ICRON choose Gurobi?

For the Vestel S&OP solution implementation, ICRON decided to utilize the Gurobi solver. There were a few key factors behind this decision. To solve Vestel's S&OP puzzle, which consisted of 150,000 decision variables (30,000 of which were integer variables) and 200,000 constraints, ICRON needed a



best-of-breed mathematical optimization solver that would be able to quickly generate optimal plans.

The Gurobi solver is used in two modes in the Vestel S&OP solution:

- The "interactive mode," in which the 30,000 integer variables are relaxed as continuous (so that a plan can be generated in only a few seconds).
- The "accurate mode," in which the integer variables are solved as such (so that it takes 10 minutes to generate a plan).

Gurobi possessed several distinctive features that were essential for the Vestel solution, including:

- **Interactive, instantaneous optimization power:** Gurobi's solver is able to respond immediately to input from Vestel's planners, incorporate the latest data, and instantly create and revise optimal plans.
- **Infeasibility analysis and relaxation:** Gurobi is able to quickly conduct an analysis to determine the root cause of the infeasibility of a planning problem and run scenario analysis to explore various possible solutions. Gurobi enables infeasibility relaxation, where certain constraints can be manually relaxed by the user so that a feasible solution can be determined.
- **Multi-objective optimization algorithms:** Gurobi's multi-objective optimization algorithms have the capability to balance multiple objectives and optimize Vestel's performance in these separate areas.
- **Warm start capability:** Users can – instead of generating an entirely new optimization solution every time they use the system with

their new changes to the data or constraints – get the solver to pick up where it left off and restart the optimization process utilizing the existing solution. This makes the system faster and more interactive – thereby enhancing the user experience.

Fueled by the Gurobi Optimization engine, ICRON's S&OP solution has proved to be a powerful tool for Vestel, enabling the company to overcome its S&OP challenges, visualize and optimize its supply chain operations, and achieve increased agility, efficiency, and profitability.

Experience Gurobi for Yourself

Our 30-day evaluation license includes:

- Free benchmarking services
- Free model tuning services
- Free access to our world-class technical guidance and support
- Two free hours of one-on-one consulting services

Visit gurobi.com/free-trial to get started!

Academics: You may qualify for a free, full-featured Gurobi license. Explore our academic program at gurobi.com/academia.