



JLG Case Study

Prescriptive Analytics & CPLEX Decision Optimization and TM1 Dashboard: Combined Planning Power at JLG Industries

The Challenge:

At JLG, a monthly Sales, Inventory, and Operations Plan (SIOP) is produced. The Master Schedule determines when and where a machine will be manufactured based on the SIOP Plan. Adjustments to the Master Schedule are made by day, product, production facility, assembly line, and forecast groups and takes approximately 10 days to complete.

The Solution:

Through research, it was determined that CPLEX and TM1 would be very compatible and the necessary toolset to deliver the Master Schedule solution at JLG.

The Benefits:

This resulted in an estimated \$700K annual savings, enabling us to shift our focus to more strategic work instead of admin work.





About the Customer

JLG Industries, Inc. has been earning customer confidence and trust through innovation since 1969. Our customers are our greatest priority, and we remain steadfast in our commitment to understanding their challenges.

As the world's leading designer and manufacturer of access equipment, JLG products and personnel can be found all over the world, going above and beyond to support customers. We deliver the powerful, versatile equipment they need along with unsurpassed training and service, because we have a responsibility to be more than a manufacturing company. We are a partner in our customer's success, reaching out worldwide to enable performance, boost productivity, ensure uptime and support forward progress. JLG is an Oshkosh Corporation Company.

Addressing the Problem

At JLG, a monthly Sales, Inventory, and Operations Plan (SIOP) is produced and the Master Schedule needs to align the SIOP plan to the current Master Schedule; adjustments are made at the production slot level by day, product, production facility, assembly line, and forecast group. Planning takes place across 35 active assembly lines, 220 active products, 10 forecast groups, and up to 24 periods in the planning horizon. This equates to approximately 1.8 Million total intersections for the master scheduler to review. Each month, the master schedule alignment to SIOP plan would require up to 10 days of work to complete and was considered 'admin' work.

The 10 day process is certainly a disadvantage, but the impacts of this are much more detrimental. Differences in planning bills for regional forecasts are significant enough, that until processing is complete, supplier forecasts are misstated. Due to material lead times, the MRP supplier forecast needs to be as accurate as possible, and updated quickly after each SIOP cycle. Ultimately, the suppliers' ability to react and adjust to updated demand are extremely limited.

“12 minutes from the time I opened TM1 for production line 22 until I got the e-mail confirmation that updates were made to the master schedule.”

- Bruce DeMaster, Value Stream Manager

Why QueBIT?

JLG partnered with QueBIT in May of 2016 for their first TM1 implementation. The focus of this solution was to migrate their SIOPI Model from EP to TM1, and to automate all other aspects of the SIOPI process that were previously done in Excel. JLG and QueBIT continue this relationship and initiated the Master Schedule project in 2017 with a core focus on improving forecast accuracy, while streamlining and automating processes. In addition, JLG is dedicated to ensuring future scalability for all models and knowledge transfer.

JLG presented a future state vision of the Master Schedule with 3 main goals:

1. Reduce manual effort by the Master Scheduler
2. More timely and accurate supplier forecast
3. More timely and accurate financial analysis for projected spend and budgets

JLG and QueBIT worked together to understand the business requirements, to determine the most appropriate toolset to solve this problem. As a result, the TM1 and CPLEX solution was developed.

“This process just allocated roughly 1,000 production slots to the appropriate forecast groups from June 2017 through September 2018 in 12 minutes, which included time to review data to make sure there were no issues.”

- Bruce DeMaster

CPLEX TM1 Integration

Through research, it was determined that CPLEX and TM1 would be very compatible and the necessary toolset to deliver the Master Schedule solution at JLG.

CPLEX is an Optimization Software owned by IBM. CPLEX is a prescriptive tool, which seeks to determine the best solution or outcome among various choices, given certain parameters. CPLEX offers engines for optimization which TM1 can leverage. In addition, data structures needed for solutions are similarly formatted to the way TM1 already holds data.





Planning Analytics/TM1 is a perfect repository for data, specifically optimization data, results, and constraints. In addition, TM1 can serve as a “gate keeper” for optimization purposes. Data cleansing is an important step in any optimization problem; by programming certain logic and rules, TM1 can “cleanse” the data prior to reaching CPLEX for optimization. CPLEX does not have a user interface, but its results can be displayed through TM1, which has several options for interfaces.

Together, CPLEX and TM1 offer a seamless, user-driven experience, which can deliver powerful optimization results at the press of a button.

Solution Results

The solution results align with JLG’s future state vision and are indicative of a successful implementation at JLG.

1. The manual effort on behalf of the Master Scheduler was reduced from 10 days, to 3 days/ month. This resulted in an estimated \$700K annual savings, enabling us to shift our focus to more strategic work instead of admin work.
2. The delivery of a more timely and accurate supplier forecast resulted in an estimated \$2.5M annual saving. The reduction of expediting and shortages associated with inaccurate forecasts, as along with a more timely and accurate financial analysis for projected spend and budgets, deliver added value.



“By partnering CPLEX with a TM1 user interface our BI Center of Excellence has been able to offer an additional platform to our user base. We are providing not only a time savings to our users but more accurate information at a much faster pace. There are projects lining up to take advantage of this toolset as it revolutionizes how we can conduct business”

-Megan L. Lillicrap, BI Analytics Manager

Products Used:

- IBM Planning Analytics Local
- iLOG CPLEX Decision Optimization

About QueBIT

Trusted experts in analytics, QueBIT is dedicated to helping organizations leverage their data to make more intelligent decisions, that result in significantly improved business value. QueBIT has delivered analytics solutions for more than 450 organizations, including some of the largest and most successful companies in the world. QueBIT solutions span the entire spectrum of analytics, from data management, including Big Data strategy and implementation, Business Intelligence, Business Planning, Predictive Analytics and IoT Analytics. QueBIT’s unique CARE methodology coaches customers to achieve independence in solution ownership, while delivering rapid time to value. QueBIT has been recognized by many industry awards. www.quebit.com