

## A Roadmap for Installing a Successful Scheduler

By Jane Lee

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### **Scheduling**

Scheduling is the last step in supply chain planning before material is actually converted. It represents the final opportunity to review information and make decisions before hard assets are expended.

Typical Schedulers respond to:

- Plans developed by the business that deal with capacity utilization, and inventory targets. These plans might be developed periodically in the Sales and Operations Planning (S&OP) process and communicated to the Scheduler.
- Changes to orders, equipment disruptions, unplanned shipments, and other events that occur between periodic updates to the plan.

Everyone recognizes that major benefits can be gained by providing better tools for the Scheduler. The challenge is to introduce these tools in a smooth and non-disruptive manner.

This article outlines a commonsense approach for introducing software tools to support and enhance the scheduling function.

### **A Day in the Life...**

The major implementation steps are best illustrated by looking at the Scheduler's day-to-day challenges.

The Scheduler has a difficult job because he or she has to deal with many people who have conflicting objectives. The job is further complicated because the Scheduler has to gather a great deal of information from different sources. The Scheduler spends most of the time gathering the right information, like the current status of the shop floor, the demand for the next few weeks, the shutdown schedule, the projected receipts of raw materials, and so on. The first task to improve the process is to make the job easier by

automating this data collection and providing the Scheduler with a single window into all this data. Therefore, **step 1 in the scheduling application is to determine the data needed by the Scheduler to do the scheduling and gather it in one place.**

The next problem that the Scheduler has is that the data from many sources is not necessarily consistent. Besides, some of the data the Scheduler needs is not kept in any system. Therefore, we need to provide the tools to analyze this data and point out inconsistencies. We need to identify problems like the following:

- The schedule has an operation for 200 of a product, but the company is swimming in inventory for that product.
- There is no inventory for a component of something that is scheduled.
- The company is missing orders for product xyz, etc.

Therefore, **step 2 in the scheduling application is to relate the data and determine internal consistency.**

Even if the Scheduler knows the problems, he or she can only react to the NEXT problem. It is difficult to see the consequences of the changes the Scheduler makes without a tool to calculate quickly the impact of changes. A Scheduler may well be creating problems in the future without realizing it because there is no time to evaluate things carefully over a reasonable horizon. The best that we can do is worry about the next major event, like a shutdown or demand spike. Therefore, in **step 3, we are going to represent the current schedule in an electronic Gantt chart and show the impact of manual changes.** The direct benefit of this is that the Scheduler will have a longer time horizon. The Gantt chart will act as a calculator and point out potential problems in the future caused by changes now.

If the consequences of the changes are going to be visible to the Scheduler, we need to make sure that the changes are consistent with the business objectives as represented by the monthly business plan or S&OP. In order to do this, **step 4 is to create a function that takes the master plan and represents it on the automatic Gantt chart, and, additionally, provide the tools to compare the plan with the current schedule.**

The Scheduler has to deal with conflicting objectives from people in the organization: the marketing organization always wants to react to its needs while manufacturing keeps complaining about schedule changes. To help the Scheduler get some of these conflicts resolved, we'll create a quantitative framework to measure how good a schedule is. Therefore, **step 5 is to create quantitative criteria for measuring the schedule.** The objective is to quantify only those elements that can be supported with data. Of course, we can't quantify everything, and it is not our intent to, but at least we can try to list the quantitative things like number of orders missed, setup costs, and so on and provide a way of costing out the schedule. The advantage of this is that the Scheduler will be able to compare the quantitative attributes of two schedules. So now, if marketing wants to make a change, the Scheduler is able to calculate if it is going to cost \$50,000 or \$2,000. This will let the Scheduler channel his or her energy to fighting the important battles rather than fighting all of them.

All of the above get us just to the point of being in control of the schedule. Once we are comfortable with this, the next thing is to reduce the repetitive work we do in maintaining it. Therefore, **step 6 is to automate the routine activities in scheduling.**

In the steps up to now, we haven't really optimized anything, and there may be much better ways of handling some of the tasks, like lot sizing, sequencing, and resource usage. In **step 7, we work with the Scheduler to identify opportunities and implement them.** This last step is an ongoing exercise and contributes to the sustainability of the solution.

### **The Software Solution**

Most commercial tools available are more suited to "project" or a software implementation exercise than to an incremental approach.

Fortunately, a new generation of software is appearing which does indeed address the need for software to support productivity, rather than for software to "solve" or "optimize" a problem.

This software has some distinct characteristics:

1. The software is designed around a non-proprietary database to facilitate getting data from many different sources for the Scheduler.
2. The software is well integrated into the desktop with seamless access to the user tools like spreadsheets, etc., so that the Scheduler can quickly utilize the information.
3. Enough analysis tools are provided to rapidly detect inconsistencies from the data and analyze the discrepancies.
4. The software supports multiple copies of the schedule and comparison among the schedules. This is needed for the Scheduler to quickly detect differences between the current schedule and the plan.
5. The software supports an incremental implementation approach. At each stage of the implementation, the software is intended to be a useful and robust tool, which is exercised by the Scheduler.
6. Because each scheduling situation is somewhat different, the business may elect to automate and optimize different facets of the problem. The software must provide enough capability for configuration so that optimization can be directed at selected portions of the scheduling problem. This includes features like a scripting language to automate tasks, optimization procedures to improve the schedule, and so forth.

### **Use What Works**

The commonsense approach outlined above has been shown to work in hundreds of implementations. Scheduling is complicated

by the number of different objectives that need to be simultaneously balanced, and these objectives tend to change over time. Our experience is that to improve the

scheduling function, it is more important to address the productivity of the Scheduler rather than “to optimize” a schedule.

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