

ADVANCED PLANNING AND SCHEDULING TECHNOLOGY PAPER



There is a phrase you are going to hear a lot about, if you haven't already. It's called "Web-enabling." There's nothing really complicated about it. What it basically means is doing what you've always been doing, but doing some of it using the Internet.

Software vendors who sell to job shops and manufacturing companies are beginning to Web-enable their products. They are giving you the same basic functionality they always provided, but now they are giving you a way to access and use their software over the Internet. The idea is to offer more capabilities for your business and, hopefully, more competitive advantages in your marketplace.

One of the keys to Web-enabling is a simpler "front end." The front end is what you see when you look at the screen, the user interface. Software vendors are taking a lesson from why the Internet became so popular so quickly – they are switching to a front end that looks more like the simple browsers you use to surf the Web. They are also allowing users to employ the actual browsers themselves – like Internet Explorer and Netscape Navigator – to gain access to software applications and to the business information contained within those applications.

Make it easy for customers

This is particularly important when you want to use the Web to link to customers. Not that you don't want your own people to work in front of simple, easy-to-understand screens. But the last person you want to frustrate because of a difficult-to-navigate interface is the customer.

But why do this? Why Internet-enable software? Why provide entry points – portals – into your internal software systems, and all the capabilities and information they hold from the Web?

The main reason is what the big boys are calling customer relationship management, or CRM. Everybody has been focusing, for longer than they are to remember, on squeezing inefficiency out of their operation. Now the big issue has become: How can I use the new capabilities that technology is providing me, especially from the Internet, to manage my relationships with my customers better and increase business?

One of the more promising areas for Web-enablement is planning and scheduling. Most shops have some type of planning and scheduling tool in place. As they gain confidence with the system, they begin to see opportunities for using the model they created of their manufacturing

What the Web enables you to do

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facility in the course of installing and operating the software – a model build around capacity limits, labor resources, routings, inventory, bills, and orders – for better business decisions.

"People typically begin by lengthening the time horizon they consider for planning and scheduling," says Charles Murgiano at Waterloo Manufacturing Software. "They move from sequencing and scheduling production to making decisions on overtime. They begin to make decisions on what shifts to schedule, or overall staffing levels. They also begin to use the information to decide how much, and what types of, capital equipment they need to acquire."

Getting information remotely

The next step is the Web.

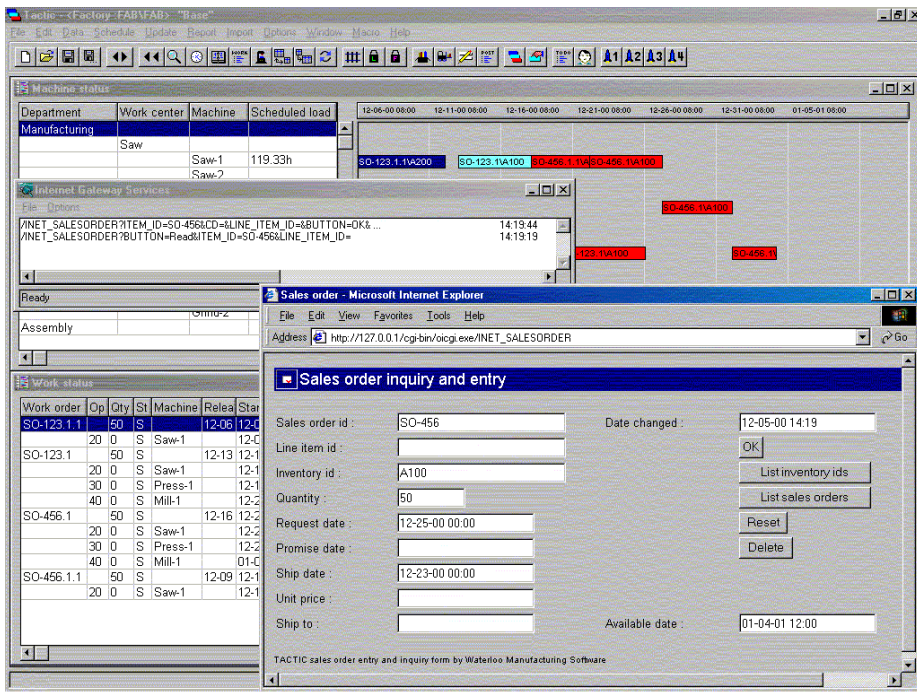
"Somewhere along the way, people realize there is information in this model that is not only valuable to them internally as an organization, but also valuable externally as well," Murgiano says. "They see that this information may be of use to their customers and can give them a leg up in the marketplace. This is how we see the use of our software evolving, and why we have begun doing what we're doing with it on the Web."

Waterloo exhibited its newly web-enabled TACTIC advanced planning and scheduling (APS) system at IMTS. The demonstration featured TACTIC's expanded order-promising and status-reporting features for Web browsers. This allows you to provide someone off-site with Internet access to TACTIC and its order-status information.

Suppose you're making a house call on a customer, or you have a sales person in the field. When you arrive at the customer site, the customer asks if you can move up the shipment date. With this new Web-enabled capability, you can use a browser to submit a request to TACTIC for the change.

What the software does

Back in the office, TACTIC can receive the request, reschedule based on finite capacity, material availability and priority rules to determine a new date, then return the projected delivery-date information. If the new date is acceptable, you or the sales person can secure a customer commitment and communicated to TACTIC the fact that the order or change has been accepted. As new and change



The image shows the TACTIC sales order from in Internet Explorer. The user placed sales order, SO-456, for 50 of part A100, with a request date of 12-25. When the user clicked OK, the browser sent the transaction to the TACTIC APS system, shown in the background. TACTIC processed the request and returned a best available date of 1-4. Transactions between TACTIC and the browser are shown in the transaction window.

orders are accepted – along with other status changes, such as production updates – anyone with authorization can use a browser to check detailed status information as TACTIC keeps tabs on orders moving through the shop floor.

“If you really think about what the Web does, it enables people to communicate better,” says Murgiano. “Contract manufacturers have to make their customers what they want, when they want it, at a price they can live with. These customers need to know two things: If I’m threatening you with an order, when am I going to get it, and if I have already given you an order, where is that order in your manufacturing process?”

That’s where Web-enabled planning and scheduling can give you a boost. Not only can you be off-site with your customer – or doing something else entirely, away from the shop – and still be able to determine where things are and when you can promise delivery. You can also set up a process where the customer can check directly on its own, without playing phone tag with you, about where the order is in the manufacturing loop.

Selecting authorization levels

Of course, you determine the level of access to the system. “What our system gives you is a Web-accessible model of your manufacturing facility,” Murgiano says. “You can see your machines, you can see your tools, you can see your people, you can see your orders. The issue at this point is, what kind of visibility do you want to provide?”

An outside sales person, if you use one, probably doesn’t need a full view of capacity – he/she just wants to enter the prospective customer order and get back a delivery date. But if you’re out at the site yourself – or like a number of job shops, your sales person is one of your top skills people – you may want to provide a bigger picture.

Waterloo provides three levels of access. The first level allows you to send in the order and get back a date. The next level provides you with full browsing capability into the manufacturing model and shop capacity, but no change capability. At this level, someone can play around to schedule and reprioritize orders, but cannot make an actual change to the shop plan. The third level lets you do whatever you want, with full authority to revamp the schedule as you see fit.

As always, there’s a gray area where you ultimately have to make the decision yourself. Shops often have unused holes in manufacturing capacity. The question is, Do you want to fill the hole with an order or do you want to leave it open for a better job you think might be coming? Or, if you fill the hole, are you stretching capacity to thin, with the potential to disrupt other orders if something unexpected happens?

Who makes the decision?

“This is what we call the ‘bumping logic,’” Murgiano says. “If you’re out at a customer site using the system and the customer is not happy with the date it spits out, you have to decide who’s going to suffer, that customer or someone else. It’s very hard to get the person out of that loop, in terms of who makes the decision. We do have some alarm logic that indicates which orders will be negatively impacted by certain decisions. But the shop owner has to make the final call.”

The ability to play “what-of” games with the system can help there. For example, the software allows you to see the standard margin on a job. But if the job is going to bump something else because it’s a rush, you can assign different rates to setup costs and labor to come up with a higher price the customer will have to pay for jumping ahead in line.

This is a crucial capability if the customer wants to place an order with a short lead-time. It allows you to decide if you want to accept the customer date, negotiate another date, negotiate a date for partial shipment, or offer complete fulfillment at a premium price. If there are going to be adverse effects on the rest of your schedule, you can

determine what is the best way, if and when you accept the order, to adjust to overall plan to reduce the impact on other orders.

The same is true if a customer changes order requirements, such as quantity or engineering specs. You can find out, if you accept the customer change, how it will affect other orders. You can also determine how you can best tweak your plant to accommodate the change to reduce disruption to the rest of the production schedule.

You can factor in other shop issues as you make and remake your decisions: Machine or tool breakage, material shortage, vendor delay, operator absenteeism. You can also evaluate business changes involving capacity, such as adding machinery, tooling, shifts, staff or an outside partner.

As the Web emerges, you'll use it to extend elements of your business to your customers. You'll do this while working remotely from the shop.

Justifying the software

Planning and scheduling software is typically justified around delivery compliance and customer satisfaction issues as well as hard savings in direct material, direct labor, manufacturing overhead, inventory, expediting, scheduler productivity, variable overhead, outsourcing, maintenance, premium transportation, back-order costs, purchasing, engineering, capital, and lost sales.

Suppose a company has sales of \$25 million and its cost-of-goods sold of 70% of sales, or \$17.5 million. Waterloo Software believes that, using planning and scheduling software, you can save 0.5% in direct material costs due to more efficient ordering, achieve increases of 5-10% in direct labor productivity, and reduce inventory by 2-5% or more.

A planning and scheduling system, the company says, can also decrease expediting expenses and result in productivity gains of 15% or higher for schedulers. The company says variable overhead can typically be decreased by 3% quality costs can be reduced by 0.5%, maintenance personnel productivity improved by 2.5%, premium transportation expenses reduced by 10%, and purchasing productivity increased by 2%.

The bottom line? According to Waterloo, a savings of \$323,809 in cost-of-goods sold and \$20,850 in operating expenses, for a total annual cost savings of \$344,659.

More Information

This paper appeared in Machine Shop Guide. The paper is being provided with compliments from Waterloo Manufacturing Software. For more information about Waterloo Manufacturing Software's advanced planning and scheduling system, TACTIC, or advanced planning and scheduling technology papers by Mr. Murgiano, contact:

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