Advanced Production Planning and Scheduling Goes Native for Industry 4.0

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Manufacturing Business Technology   Best Practices

Advanced production planning and scheduling (APS) is an essential part of manufacturing if efficiencies are to be optimized where there are competing priorities on resources. The process considers raw materials, equipment availability and production capacity and allocates them in the best way to meet customer demands. There are several different tools that may be used to implement APS to deliver excellent scheduling results—but what is different about 'native' scheduling and why should you be paying attention to it?

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What Is 'Native Scheduling'?

Native and non-native scheduling are different because of where the application resides. Native scheduling exists within the manufacturing execution systems (MES), whereas non-native scheduling works using a tool that runs *alongside* the MES. Non-native scheduling options can come in several different forms. They may be provided by specialist companies in the area of scheduling, be a module within the enterprise resource planning (ERP) system or third-party scheduling module integrated into the MES, or as a bolt-on provided by the MES company. While all of these *can* and often do offer great scheduling, they do not fully and entirely work within the MES, fully sharing master data with integration and synchronization at the deepest level. Indeed, native scheduling within the MES is not the usual or traditional offering and is it is actually quite rare to find a true native scheduling option within a system.

Why Do You Need Native Scheduling?

So why should you care whether a system offers traditional APS or native scheduling? The answer lies in efficiency. While historically, the efficiency of a separate APS module has sufficed, the change to Industry 4.0 manufacturing models with dynamic rather than linear process flows, means the difference in efficiency is limiting the full realization of benefits of a smart shop floor. This is because a scheduling application which uses its own database needs to integrate with the MES for data including calendars, maintenance schedules, information on equipment status and setup matrices and synchronize this information with materials and work in progress (WIP). This all requires transformation of data into an appropriate form, transfer to the APS application and then transformation and transfer back again to the MES for execution. The work and time required means the MES and APS cannot react quickly to dynamic changes on the shop floor. The systems can get out of step and schedules cannot always be executed as

planned, disrupting the flow and productivity of the business.

Conversely, the shared master data of an MES with native scheduling means the scheduling runs seamlessly. Latest data is always available as production progresses and new schedules are published without the need for XML or file transfer activity. The streamlined native system further reduces implementation time, better optimizes operations and helps with maintenance activities to reduce total cost of ownership and overall risk to production. In a pragmatic and intelligent way, the system will respond more quickly than traditional APS to changes in business priorities, demand and unexpected interrupts to normal operation, improving on-time deliveries and business margins. As a native part of the MES, schedules will be optimized for *total* plant performance as well as being validated and enforced with complete visibility to the operator for total peace of mind.

Cleaner data, lower risk and happier IT

From an IT perspective, natively integrated scheduling means there are no challenges, risks or delays from system integration activities. One data set removes the need for any duplication and any opportunity for discrepancies between systems. As there is also no need for additional user interfaces, the system requires reduced levels of support and presents a lower cybersecurity risk. When any changes, upgrades or

maintenance to the system is required, these are automatically synchronized without the need for additional adjustment, integration testing, and separate deployment, reducing the ongoing maintenance cost of the system.

Bag the lot: Faster, better and cheaper

Of course, the benefits of native scheduling: increased efficiency, reduced risk, easier maintenance, and streamlined operations; reflect back into clear overall business benefits. Having a single system with a single license equates to reduced setup costs, less training overhead, and better optimized maintenance using fewer resources. This significantly lowers the total cost of ownership compared with an MES with non-native scheduling.

Benefits are also not limited to operations and IT. Supply chain, logistics, customer service, finance, and sales are all likely to benefit from the more robust and responsive scheduling. The added agility and responsiveness native scheduling adds to a business means customers are more likely to get what they want, when they want it. Fewer costly delays, improved on-time delivery and better optimization of operations all bolster brand, enhance customer loyalty, and add to the bottom line of the business.

Preparing for the Future

There has been much talk around Industry 4.0 and the changes that are happening in manufacturing industries, particularly for the production of more sophisticated and complex products. Benefits of changing to a smart factory with distributed intelligence and dynamic processes throughout the shop floor include greatly increased efficiency; economic production of low-volume, high-mix batches, and faster response to changing customer demands. Ultimately, the industrial revolution we are seeing today is about business agility.

Without native scheduling, the full benefits offered through Industry 4.0 cannot be realized. With native scheduling, companies will increase their agility and better respond to customer needs without any complications from complex middleware system integration. They will be prepared for the unexpected and reduce the risk of disruptions – whether they be from competitors, new product introductions or supply and demand shifts due to natural disasters.

Clear Benefits – but How Do You Get Native Scheduling?

Having native scheduling as part the MES has clear benefits in terms of efficiency, agility, and reliability—but how can a company capture the rewards it offers? As always, the right thing for a business will depend on the return on investment.

For businesses looking for a new MES, it simply makes sense to find one that has been built from the ground-up with scheduling. For those looking just at scheduling software, however, the very nature of native scheduling means it cannot be bolted on. To gain the benefits requires a shift to invest in an MES with scheduling, which may seem a tall order to sell to the management team. But the benefits are strong and, although on the surface it may seem a big undertaking, there are many additional advantages to a complete review the whole manufacturing system with a view to securing the business in the future with full Industry 4.0 capability.

A Future With Better Business Outcomes

The technology to make Industry 4.0 a reality is with us today. Ignoring the benefits of more efficient and agile manufacturing puts businesses at the mercy of their competitors. Although changes will not happen overnight, they will come and, especially for more complex production systems, companies need to consider a pathway to Industry 4.0 to avoid being left

behind.

Native scheduling is very much a part of achieving the full agility, accuracy, and efficiency offered by Industry 4.0. Pulling the key element of smart supply chain execution in as a deep synchronization of activities in the plant enables the vision of Industry 4.0 to speed toward reality with more confidence and better business outcomes.

Chris Parsons is vice president of marketing for Critical Manufacturing.

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