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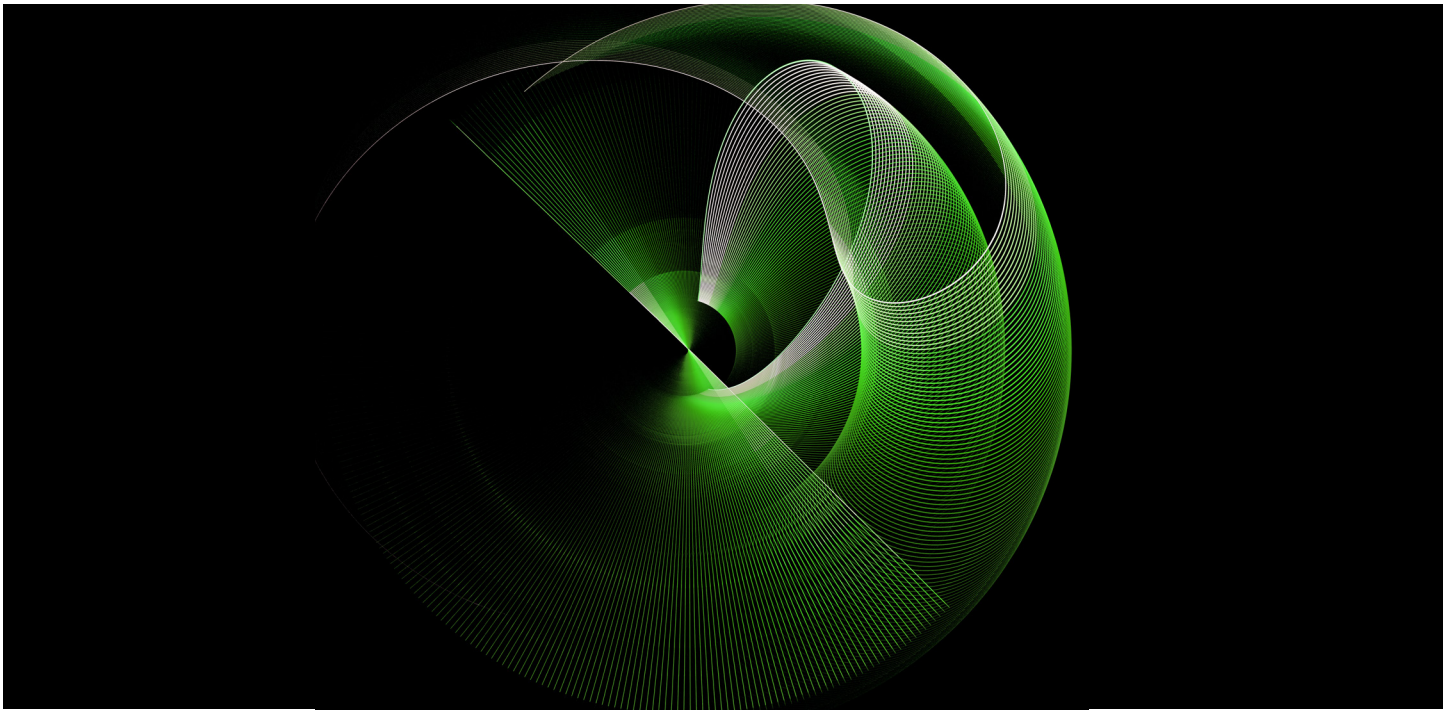

Manufacturing agility through dynamic scheduling with DMES

A manufacturing plant is a complex, ever-changing environment. Production orders are submitted and amended. Materials arrive from numerous vendors. Machines with varying autonomy function alongside human counterparts. And the technology ecosystem interacts with programs throughout the enterprise.

For manufacturers, efficiency and productivity are seized by adapting planning and scheduling to this evolving plant environment. Yet, for many manufacturers today, scheduling is still accomplished with a patchwork of antiquated custom programs and frequent manual entries in an Excel sheet. What is needed is greater capacity to adjust production in real time with improved analytical capabilities that enable maximum efficiency and throughput.

This series on a modern manufacturing execution system (MES) has looked at how platform consistency across plants and data connectivity enable greater productivity, supply chain management, material and labor traceability, and much more. When it comes to scheduling, MES draws data from enterprise-level systems to give far richer visibility into production constraints, which allows planners to make fast, informed decisions to keep all the components of the manufacturing plant humming at peak performance and efficiency.

Transforming scheduling with a modern MES gives a manufacturer a valuable competitive advantage, and manufacturing sectors are already investing to realize a higher level of production and efficiency.

Toward real-time scheduling

Consider the status quo in manufacturing scheduling. Enterprise and plant leaders invest time and effort with old ways of planning but continue to miss the production schedule. The offline tools and local knowledge are insufficient to manage constraints. Scheduling is done on timescales of weeks and months, not days, hours, or minutes. A multitude of people are charged with scheduling which orders go where, but their processes may not be informed to the degree they could be, and likewise coordination may be elusive. Thus, as changes happen often and

without prioritization, reactive and lethargic mitigation efforts still result in downtime, unmet delivery dates, needless inventory, and a host of other suboptimal outputs that weigh on the bottom line.

No surprise then that some manufacturers are making investments to drive toward improved scheduling. According to the 2020 Deloitte-MAPI Study of manufacturers, of the nearly 70% of manufacturers connecting with a new production ecosystem, 23% are operationalizing factory synchronization and dynamic scheduling. The future of productivity is already taking shape, and dynamic scheduling allows manufacturers to think and plan at a speed that is in line with the way production is changing.

The need is to create the most accurate production schedule before production begins and then adapt in real time as the operational environment evolves. Part of the challenge is that there are multiple systems at work, and one of the most complicated system interactions is between the operation systems and the ERP. Data needs to flow between ERP and operations and back, such that planners and end users can understand what is happening in real time. With this, discrete constraints (even those that emerge during execution) can be managed and mitigated to permit an optimal schedule.

For example, a machine breaks down, and a planner is notified. With a dynamic view of the entire end-to-end process from the machine layer to MES to ERP, a solution is developed for the schedule and everything before and after the change is adjusted accordingly. Planners can make decisions to course correct not one line but the entire factory.

Rather than installing a bespoke or heavily configured solution at each plant, DMES uses a global template for a plant network and then tailors the standard platform to each plant.

Combining the power of AI and MES

The capacity for dynamic scheduling to drive value is attractive, but implementing a MES solution that can permit dynamic scheduling can seem daunting. A rapid, efficient approach is selecting a platform that is preconfigured for your manufacturing sector and can be fine-tuned at the plant level. An example of this approach is Deloitte's MES solution (DMES), a process-led, turnkey path to MES implementation. Rather than installing a bespoke or heavily configured solution at each plant, DMES uses a global template for a plant network and then tailors the standard platform to each plant.

The DMES preconfigured MES solution enables a portfolio of manufacturing operations management capabilities, including advanced production scheduling. When this platform is combined with a dynamic scheduling algorithm, a facility can increase both its agility and throughput. Planners can focus on establishing and maintaining the optimal production schedules for their area, while the dynamic scheduling solution provides real-time recommendations for the "next best action" that will keep production moving despite constraints.

Consider an order that is ready to run, but a bag of materials is dropped and contaminated. The MES and dynamic scheduling algorithm can immediately return recommendations on how to adjust the overall plant schedule, maximizing productivity and efficiency while staying on track to meet production targets and delivery dates. Or consider a scenario in which a certain machine operator is unavailable, stalling a run. The AI scheduling system can identify alternative orders to produce, avoiding downtime that is both costly and threatens production timelines.

This capacity to use an AI-fueled scheduling system across plants is one outcome from transforming MES with a preconfigured solution. It helps manage expected and unexpected constraints within a production day in a way that is impossible with legacy systems and manual processes. And there is another benefit. After decisions are made, whether autonomously or by a human user, that information is shared elsewhere in the enterprise system. Because all plants operate using the MES, data is seamlessly populated throughout the organization, yielding both important production data and insights that can improve operations at other plants.

Ultimately, dynamic scheduling is just one component of value seized by shifting to a modern MES solution. When manufacturers connect ERP, operational, and production data with AI and other systems, the uninterrupted strands of data permit greater efficiency and productivity, as well as the essential agility to pivot and adapt schedules when constraints arise.

Let's talk!

By choosing Deloitte's DMES solution, you can jump-start intelligent and timely transformation toward smart factory capabilities that align with your organization's broader goals. It all starts with a process-led, turnkey approach that leverages many years of digital transformation, manufacturing operations, and systems implementation experience. Contact us to learn more about DMES or to discuss a specific challenge your organization is facing in its digital transformation journey.

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