



## Introduction

High-mix, constantly changing discrete manufacturing and service environments are generally quite chaotic. Even with years of investments in enterprise resources planning (ERP) software and in some cases also finite scheduling, few companies have succeeded in providing real-time scheduling and visibility to shop floor operations. nMetric® Smart Job® Scheduling delivers a unique way to improve performance by embracing uncertainty and providing real-time visibility to proactively manage operations. This new approach can integrate into existing enterprise software and manage the dynamic production environment. It thus provides the missing link between the shop floor and ERP or other business systems.

## The ERP Challenge

ERP was developed as a financial and materials resource planning solution, on the assumption that better planning equates to increased efficiency. This is true, to a certain extent. Planning solutions are critical for having materials and other resources ready at a gross level. ERP manages and tracks the costs and timing of material flow and production as it is expected. The challenge is that in the real world, things do not always go according to plan. Nowhere is this more apparent than in a complex high-change, high-mix production or depot-style logistics environment.

ERP (or MRP legacy systems) generate a production or operational plan regardless of whether the facility actually executes the planned schedule. Plans often assume infinite capacity and do not consider whether all resources are available as planned. Additionally, these systems are unable to show what tool and people resources are required and available. As it turns out, machines don't always work, people get sick, tools break, materials do not arrive on time, and customers do not order as they did last year. The gap between the plan and the dynamic reality of the operational environment becomes increasingly apparent. The "fly in the ointment" is that the past does not predict the future and reality does not match the plan.

## Traditional Scheduling

In the ongoing effort to close this gap, finite capacity scheduling was introduced. These systems work to identify constraints and bottlenecks in an attempt to impose order on the uncertain environment. This works pretty well for strait-line production environments. Algorithmically derived, constraint-based schedules assume fixed bottlenecks, a static product mix and little change in demand. However, in the more complex environments, bottlenecks or constraints can shift due to a high mix of products, volume variability, resource availability, and other changes. These weekly or daily snap shot schedules they create are almost immediately obsolete. In some cases, algorithms must be written to accommodate every possible permutation; so as rules are added, traditional solutions bog down even further.

## Smart Job® Scheduling

In contrast, nMetric's Smarter Scheduling™ software accepts this inherent uncertainty. Its patented Smart Job® dynamic scheduling technology is based on a distributed and probabilistic approach. Rather than one pre-planned schedule that you can either run or you can't at a given moment, nMetric Smarter Scheduling expects change and equips individual production processes to cope with that change, interacting with other processes in an effective way.

The individual processes are encapsulated in Smart Job distributed software objects that react automatically and dynamically to unexpected events. They self-correct to deal with the changes of the operational environment with no need for manual intervention or specially-written situational algorithms. nMetric's distributed approach also allows the system to accommodate the way each operation works and optimize performance.

One of the reasons traditional scheduling is so difficult in high-mix environments is that all work is scheduled to an individual resource and does not capture why that resource was chosen. nMetric captures these capabilities in the form of attributes assigned to all resource types – people, machines, work centers, tools and materials. Task requirements are also converted to the attribute required for completion. At first this may seem more complicated, but it actually makes scheduling much easier and more flexible.

Once the attributes for the resources and tasks are defined, nMetric optimizes schedules heuristically – based on multiple criteria including task dependencies and priorities – to maximize on-time completions. It breaks down every order into a series of self-routing Smart Job distributed software objects. Smart Jobs reserve the resources required to ensure task completion based on resource attributes, that is, their specifications and capabilities. This gives Smart Jobs the flexibility to find and reserve a different, suitable resource should its original choice become unavailable.

Using real-time status feedback from Smart Jobs and information from existing systems, nMetric replicates the environment virtually and presents it in an easy-to-review Gantt chart format. Smart Job Scheduling delivers a highly accurate and dynamic view of production capabilities, with complete visibility even as adjustments and changes occur in the actual environment.

This unique approach delivers a consistently realistic, forward-looking schedule based on current assets and actual resource availability. With this new level of visibility into every aspect of the entire production environment, personnel can foresee issues and resolve bottlenecks. With this approach, companies with high-mix or dynamic environments can proactively manage the shop floor and respond to customers in record time, keeping promises to deliver and improving cash flow and profitability.

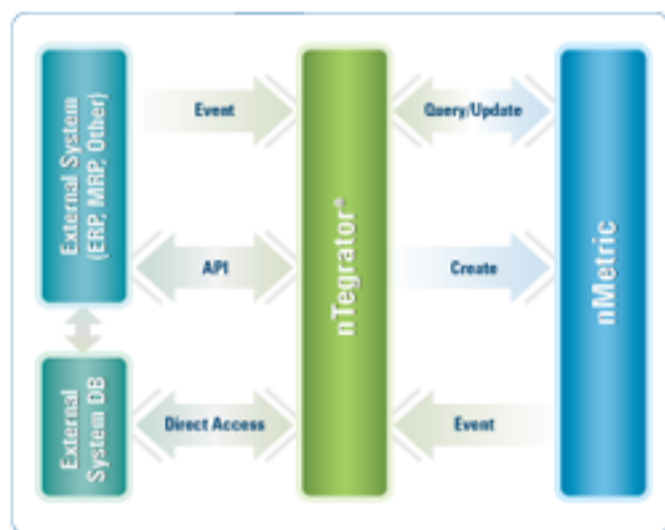
### nMetric extends ERP to embrace change:

- Virtually replicates your dynamic environment
- Easy reschedule through capability attributes
- Real-time reschedule of work not completed
- Schedules all resource types
- Priority focus to expedite critical jobs
- Real-time, realistic, dynamic, forward-looking scheduling

## Partnering with ERP

nMetric does not compete with ERP or legacy planning systems, it complements them. nMetric has partnered with Talend to create easy-to-implement integration with any ERP system to enable two-way communication of relevant data. It combines their information on orders, materials, production routings, and bills of material with nMetric's real-time resource and Smart Jobs status to deliver a complete picture of the operation.

Simply put, nMetric's Smarter Scheduling software does what no other solution can currently do: it closes the gap between what is planned, what has actually happened, and what is or is not happening right now and in the future. For this reason, it is the ultimate real-time production scheduling solution.



The nMetric team has one guiding principle: make the job of scheduling easier, less time consuming and more productive. nMetric develops scheduling and task management software, and holds patents on the Smart Job® method of dynamic scheduling. nMetric Smarter Scheduling™ uses the scheduling engine to synchronize planning, execution, tracking and analysis. This approach ensures not only that the four functions are working well, but that they are working in unison to drive the best possible outcomes.

nMetric 6.0 is a unique solution that allows organizations to achieve Smarter Scheduling and realize a high level of efficiency, productivity, quality and reliability. nMetric's Smarter Scheduling solution has the ability to adapt to change, complexity, and real-time events that could otherwise derail the schedule, and produces the greatest possible scheduling flexibility.