

# Genetic Optimizer (GO) for Microsoft Dynamics® AX

Optimize production scheduling, meet changing consumer demand and deliver the right product at the right time with this flexible, easy-to-use tool, native in Microsoft Dynamics® AX

## Key Benefits

Genetic Optimizer (GO) features functionality designed to address specific production scheduling needs and to produce greater throughput. Robust functionality includes:

- Fast and effective schedule optimization
- Rapid rescheduling during a production run
- Multiple versions of schedules saved for comparative evaluation
- Full integration with Dynamics AX Calendar for resource-level operating hours and planned downtime
- Gantt Chart graphical output with dynamic drill down functionality
- Graphic allergen alerts notifying line supervisors of required wash times
- Service reports identifying any planned late production completion
- Resource capacity constraint consideration (incl. tank constraints)
- Planned resource utilization reports
- Schedule Adherence reporting
- Load balancing
- User-defined parameters
- Capability to upload demand from spreadsheets or use MRP output direct from Dynamics AX

## The Challenge:

Production scheduling, by definition, is a very complex process. Planners are required to balance customer needs with raw material availability, production capacity, maintenance schedules, existing inventory, and many other factors. As a result, scheduling is often entirely reactive, and planners are forced to re-plan throughout the day, making the process a very manual one and a tricky balancing act. Planners often use a combination of spreadsheets and whiteboards to draft the schedule, and there is no true “plan” against which to measure performance. Manufacturers may start the production shift with one schedule and end the shift with a different one.

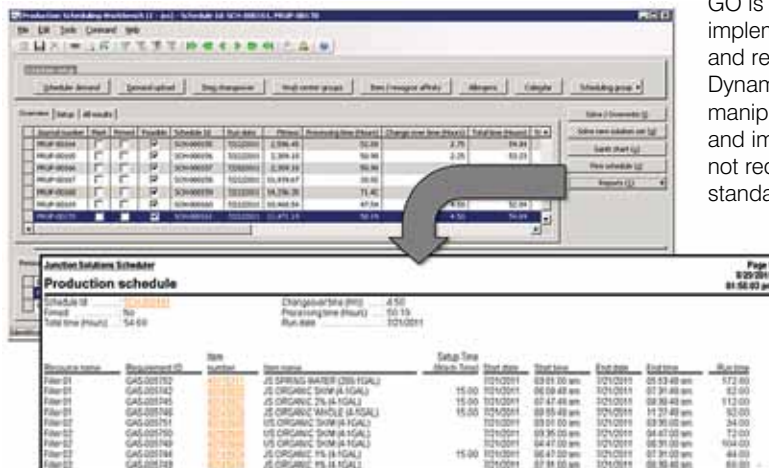
The challenges with this planning style include multiple, different versions of schedules being used across the plant simultaneously. Add to the mix, numerous planners and their unique planning processes, algorithms, and tools and you have a recipe for confusion and inefficiency. If there is no single “master schedule” for the entire operation, teams must conduct multiple meetings to review current status and changes. Additionally, these manual processes may result in an excess or shortage of inventory, late delivery or late completion of production, and excessive down time due to changeovers. But what is the simple, singular answer to these production challenges?

## The Solution:

Junction Solutions’ Genetic Optimizer (GO) is the answer to streamlined production scheduling. GO is a production scheduling application native to Microsoft Dynamics AX. The tool provides both discrete and process manufacturers with a fast, flexible planning solution that’s easily implemented without third-party software or complex integration. It leverages core Dynamics AX functionality, and extends base production scheduling to enable manufacturers to meet changing consumer demands faster, while reducing costs associated with changeover-driven downtime.

While traditional MRP-based production scheduling does not take changeovers into account, GO seeks to minimize planned downtime by optimizing the sequencing of changeovers. It does this while also considering allergen related downtimes, the operating calendar, individual order due dates and times, bill of materials requirements, resource (equipment and workstations) throughput capacities, and several other factors. By considering these factors, GO produces a much more efficient, economical, and effective schedule.

GO is a user-friendly application designed for quick implementation and minimal elapsed time between go-live and realization of benefits. Because it is native in Microsoft Dynamics AX, the amount of offline data collection and manipulation is minimized, translating to reduced workload and improved quality of schedules. In addition, GO does not require a significant learning curve compared to other standalone commercial optimization tools.



## Proactive, Accurate, & Optimized Scheduling

GO extends upon traditional MRP-based production scheduling with changeover-driven optimization. It uses proprietary sequencing heuristics and a cutting-edge genetic algorithm to minimize planned downtime due to product changeovers, allergen sequencing, planned maintenance, order due dates and times, bill of materials requirements, resource processing capacities, along with other factors, for accurate and optimized production scheduling.

With its full integration in Microsoft Dynamics® AX, planners are empowered to effectively balance customer needs with raw material availability, production capacity, maintenance schedules, and existing inventory. As a result, scheduling is more proactive than reactive, and the plant can focus on execution instead of making constant changes. When re-planning is necessary, GO provides a “current state” interface that allows the planner to enter what is currently running on which resources. When the changes have been made, such as quantity changes or resources taken offline, the new schedule will take these and current conditions into account.

## GO – The Must-Have Single, Simple Solution for Production Scheduling in Process & Discrete Manufacturing

The GO scheduler enables manufacturers to reduce the workload associated with scheduling, while improving the quality of production schedules and quickly responding to changes within the schedule throughout the day. Simply stated – GO schedules production in the most efficient, economical way possible. The GO scheduler does the work for you, optimizing even the most complex production and packaging schedules, such as make to order. The consolidated planner workbench and complete integration

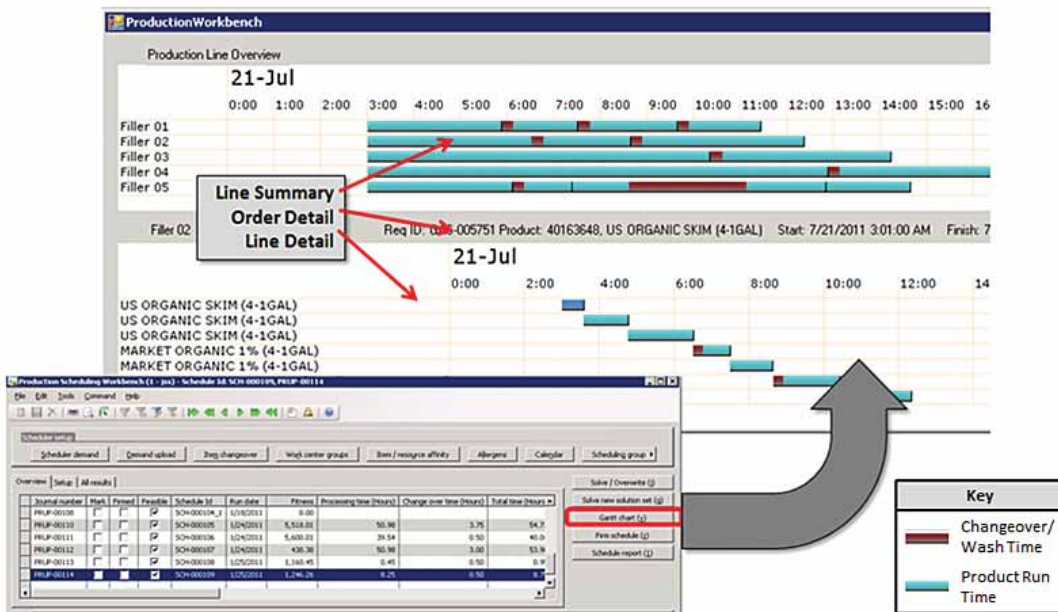
with Microsoft Dynamics AX streamlines the planning process, significantly reducing planner workload. Because the plan is created and maintained on a single centralized system, the operational teams work together across the enterprise instead of trying to plan using potentially numerous and competing objectives. A single, centralized schedule also enables monitoring and reporting performance to the plan.

### Benefits of GO's complete solution offering include:

- A single, comprehensive published schedule that synchronizes the activities of all aspects of production
- Reduced planner workload, freeing up capacity of high-value staff to work on critical projects
- Consistent planning methodology across the organization
- Fewer time-consuming meetings required to review and adjust
- Reduction of excess inventory and instances of shortages
- Improved on-time delivery and completion of production
- Increased throughput capacity resulting from minimized planned downtime
- Less scrap due to inefficient changeover planning

### GO supports fluid batch processing operations, such as Dairy and Brewing, as well as discrete manufacturing. Some of the specific functional capabilities include:

- Multiple inputs and outputs, such as from tanks to fillers
- Tank minimum use levels and storage capacities
- Product and resource-specific processing rates
- Multi-level bills of materials with automatic creation of dependent production orders



### Streamlined Scheduling Using a State-of-the-Art Genetic Algorithm

The Genetic Optimizer evolves an answer to the scheduling problem by taking the strongest “individuals” from a population of potential solutions, and uses them to propagate additional solution sets. In this way, the ultimate solution evolves as a matter of technological “survival of the fittest”. Only in this case, the planner defines “fittest”. Characteristics such as: on-time delivery, adherence to preferred changeover sequencing, allergen avoidance, and delayed start, are set according to business priorities. An additional benefit of GO is speed. By using only the strongest individuals from each population, run time typically required to evaluate and compare every possible combination can be omitted.

### Straightforward “Operator Focused” Configuration

GO is easily configured to support virtually any production operation. Any activity, process, equipment, or workstation that has quantifiable flow rates and capacities can be defined as a GO Resource and included in the schedule. For example, assembly, blending, cooking, filling, machining, and packaging can be scheduled individually or sequentially as a manufacturing process. This approach allows planners to setup and configure GO according to their requirements and processes, and using their familiar terminology.

### Support for Complex Process Manufacturing Operations

The flexibility, power, and speed of GO enables it to schedule complex, multi-step process manufacturing operations such as fluid dairy. In this example, GO schedules conventional and organic products across multiple pasteurizers, tanks, and fillers. Orders, or production, are scheduled in such a way as to maximize on-time delivery, while minimizing allergen cleaning and changeover-driven downtime, and within the production constraints specified for each piece of equipment.

### Quick and Flexible Rescheduling When Needed

In dynamic, high-volume production environments, it is often necessary to reschedule during a production run. GO gives the planner the ability to specify which products are running on which resources and, if tanks are involved, how much product is in each tank. GO will generate the go-forward schedule based on this user-defined “current state”. This capability, combined with the speed of the solver, gives planners significant decision support via “what-if” analysis to overcome unplanned operational challenges.

### Reduce Time to Generate Plans and Enable “What If” Analysis

GO can generate schedules for single-step manufacturing processes in seconds, and for complex multi-step processes in just a few minutes. This gives planners the ability to reschedule, or conduct high-value what-if analysis throughout the day. Plant managers regularly work to determine the impact of adding or removing a piece of equipment. With GO, this is as simple as removing or adding equipment to the GO Resource Form and re-running the schedule. Another constant concern is the issue of unplanned equipment downtime due to failure. In this case, the planner simply takes the resource offline through the GO Workbench and creates a new schedule. The remaining production orders will be reassigned as feasibly as possible, and if service violations are created, they will be highlighted to inform the planner.

### Flexible Delivery Model Options

GO can be delivered as an on-premise solution, or using the on-demand delivery model. This gives customers flexibility in choosing a solution that best fits their business needs.

#### Why Microsoft Dynamics® AX?

Microsoft Dynamics AX is an industry leading, proven, ERP solution that optimizes accounting, customer relationship, and supply chain operations. By automating and streamlining business processes, Microsoft Dynamics AX helps people find, use and share information, meet shifting economic and industry demands, and capitalize on new opportunities. Junction Solutions selected Microsoft Dynamics AX as its ERP platform of choice because it enables organizations to work efficiently and make accurate business decisions with confidence.

#### Unique Flexibility

Microsoft Dynamics AX enables organizations to run their business the way they want. With more built-in functionality than any other mid-market ERP solution, customers can choose only the features they need and simply “turn on” new features as their business grows.

#### Advanced Technology

Microsoft Dynamics AX lets customers choose the architecture that best matches their infrastructure and budget. Its powerful, object-oriented environment is structured for straight forward development. Customizations are kept in separate layers, leaving the original application code unchanged for easy and cost effective upgrades.

#### Global Capabilities

Microsoft Dynamics AX helps scale real-time connectivity across different locations using one common, master-control database, and support for multiple language and currency capabilities.

#### Microsoft Platform

Microsoft Dynamics AX takes advantage of the many features of Microsoft SQL Server. Customers who choose SQL Server benefit from improved access to application data, simplified deployments, ease of maintenance, and faster application response. .NET technology provides the capability to quickly build, deploy, manage, and use connected, security-enhanced solutions through the use of Web services.



### **About Junction Solutions**

Junction Solutions is an award winning provider of vertical-specific on-premise and on-demand software applications and services that help organizations enhance operational performance, reduce costs, optimize and expand delivery channels, and strengthen customer relationships. Built on Microsoft Dynamics® AX, and designed specifically for Food & Beverage, Multi-Channel Retail and Distribution companies, Junction Solutions' innovative offerings focus on enterprise resource planning (ERP), and provide users with 360-degree visibility across complex B2B and B2C operations including supply chain management, human capital management, merchandising, order entry management, call-center management, eCommerce engagement and fulfillment.

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**Where technology meets innovation for Food & Beverage, Distribution, Multi-Channel Retail companies.**

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