

# Planning and Scheduling



- Forecasting
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- Infinite, Finite and Constraint Based Scheduling

Performance-driven companies have mastered the art of predicting and responding quickly to changes in customer demand with minimal business interruption. Whether you are a global, multisite enterprise or a single site manufacturer or distributor, precise and flexible planning and scheduling is imperative to efficient and profitable operation. Epicor offers a comprehensive solution for forecasting, material requirements planning (MRP), scheduling, and advanced planning and scheduling to meet the needs of today's agile businesses.

## Forecasting and Master Production Scheduling

Forecasting and Master Production Scheduling (MPS) in Kinetic are included with the Material Requirements Planning module and are designed to assist manufacturers and distributors with both day-to-day control and long-range planning and decision making. Forecasting and MPS support businesses that operate multiple, mixed-mode strategies simultaneously. Forecasting & Master Production Scheduling functionality includes:

### Forecasting

Forecasts can be generated from multiple historical sources (e.g., sales, invoice, and inventory usage history). Users can also manually enter forecasts for companies, plants, customers, dates, and parts, cut- and-paste from other applications into the forecast system, or generate forecasts from multiple historical sources (e.g., sales, invoice, and inventory usage history).

Another option is to export and import forecasts to and from other applications or customers. Import options allow forecasts to be broken down by part, customer, plant, date, and company. This import can update the existing forecast, be a new forecast, or be a complete clear and re-load.

### Forecast Buckets

Bucket forecasts for variable periods: daily, weekly, monthly, yearly, etc.

### Forecast Analysis

Forecast any number of variables (e.g., revenue) rather than just forecasting product units. Forecasting allows any number of tiers to be forecast and analyzed (e.g., forecasting product units by company, state, city, and customer).

### Inter-Company Trading

Dynamically accept forecasts from other companies within the enterprise. This allows companies to give visibility to the supply company of future demand without needing to raise a firm intercompany order.

### Master Production Schedule

Enter production forecasts for specific end parts using the MPS function. Perform an iterative process of entering a planned schedule, viewing the effect on your resources, then modifying the plan until you have achieved an optimal schedule. Manually enter or cut-and-paste MPS from other applications or automatically generate the MPS from the forecast.

## Driving Capacity and Raw Material Procurement

Make and alter MPS decisions based on constraints. Both forecasting and MPS can independently drive future demand.

### Planning Bill of Materials

Planning Bill of Material is an unbuildable BOM that allows the user to express the lower-level parts as a percentage of the total number to be sold. This is the traditional way for manufacturers to forecast lower level parts.

## Epicor Smart Demand Planner

Epicor Smart Demand Planner provides cloud-based statistical forecasting that automatically selects the right forecast model for each item—accounting for trend, seasonality, and promotion/event-driven demand. For companies that manage many items like component parts, service parts, material requirements planning, or high-tech equipment, it includes an intermittent demand model so you can accurately forecast the inventory needed to hit desired service levels. Once the baseline forecast is produced, it is available for collaborative review and consensus planning by authorized stakeholders. In addition, forecast accuracy can be measured to help ensure the best possible forecast is delivered to the business at both the aggregate and item-mix levels.

Epicor Smart Demand Planner seamlessly integrates with Kinetic software using an “out of the box” connector that simplifies implementation and support.

**Note:** Learn more about related Smart products in the [Supply Chain Management chapter](#).

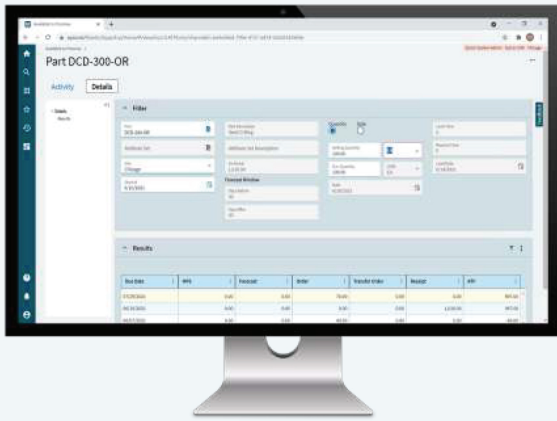
## Material Requirements Planning

Built for the needs of a single site as well as extended enterprise, MRP offers cross-plant and cross-company planning. Enhanced to offer plant source as well as product group sourcing of materials and assemblies, MRP automatically and visually extends the enterprise to efficiently manage supply and demand, from forecasting and MPS to MRP generation, and more. Material Requirements Planning functionality includes:

### MRP Generation

Run MRP with either net change or full MRP regeneration options. The MRP generation process balances the demand of customer orders and forecasts with the supply of jobs. As orders and forecasts change, MRP automatically adjusts corresponding jobs so you are in balance. MRP even reschedules by your plant or part for you.





*Material Requirements Planning—Check supply and demand of a part with Available- to-Promise functionality*

## Material Planning

Create purchase order suggestions for inventory and purchased parts that are needed to complete production. Use lead times and vendor price breaks to determine when the part should be ordered and at what price.

## Planning Contracts

There are instances where parts need to be manufactured or purchased to satisfy a future requirement for a product or job that has yet to be fully developed from an engineering standpoint or there are long lead items that need to be purchased or built before the upper level orders are ready to be released. The Planning Contract gives you the ability to manage long lead-time items before a trigger appears for demand. Best of all, it allows you to earmark these items for specific needs even if a Job or Sales Order has not been generated yet. The planning contract concept is used specifically in a situation where the supply generated to fulfill a contract is consumed by the actual demand linked to the same part in the same planning contract. Supply for contract materials is kept distinct from other general supply. The Multi-Level Pegging Process pegs demand and supply, if they are linked to the same planning contract. Link Planning Contracts to demand and supply. The demand you link to a planning contract is filled by the supply you link to the same planning contract. As a result, the demand is fulfilled specifically from the assigned contract warehouse/bin locations, and excludes other non-planning contract warehouses/bins from the fulfillment process. You can link a planning contract to a job, project, purchase order, sales order, transfer order, or quote.

## Dynamic Lead-Times

Take into consideration variables such as the batch size, production calendar for a resource, the run rate of the resource utilized, and the availability of material flagged as constrained in production schedules.

## Part Planning Tools

Account for production prep, kit, and receipt time. Use this to derive cycle-times and appropriate lead-time for producing the product.

## Plan as Assembly

Use Plan as Assembly to plan lower component manufacturing parts without the need to include them in the full assembly structure. This feature enables complex planning for multilevel complex parts with components that are typically stocked.

## Planning Horizon

Review the planning horizon of a part or resource, then plan up to, but not beyond the horizon, preventing premature planning.

## Auto Job Firm Process

Use predefined rules to firm up and move MRP production requirements to production planning automatically, for rapid response to current demand.

## Multisite

Run MRP for all plants or for individual plants within a company. Changed schedule dates roll down to all subcomponents—even those being manufactured in another plant.

## Multilevel Pegging

Analyze all the supply and demand in your system, then peg each supply against demand, prioritized by due date. Because supply is calculated for every inventory item from all possible sources—regardless of whether demand exists—you are alerted to items that may be overstocked or obsolete.



## Sourcing By Site

Define a unique source per part or site— whether its default sourcing is purchased, produced, or transferred. What is produced in one location may be purchased—or transferred in—from another.

## Available-to-Promise

View running balances with the available- to-promise function. Enter a quantity, and the system will find the earliest date that quantity will be available. Enter a date, and see how many parts are available on that day. MPS, forecast, order, and planned receipt quantities are visible to help you in your production planning tasks.

## Planning Types

Maximize your planning accuracy with multiple types of inventory planning, including minimum/maximum/multiple, days of supply and run out.

## Rough Cut Horizon

Enable MRP to process more efficiently by removing the time spent scheduling beyond a specified threshold or rough cut horizon.

## Recycle Jobs

MRP reuses un-firm jobs for optimum MRP performance.

## Short Horizon Days of Supply

To optimize MRP performance, a Short Horizon Days of Supply field is included within the Part Maintenance program on the Plant Detail sheet. This field defines a material value that will be used when MRP determines that the needed materials falls within the Short Horizon.

## Calculate Manufacturing Lead Time

Plan for part components lower down in the assembly structure for accurate MRP scheduling.

## Start Minimum Quantity

Account for partial material availability in MRP calculations to get started earlier with available material and improve delivery performance.

## Bill of Materials Check

MRP checks the revision level and verifies approvals before pulling in a standard BOM and routing. For parts that do not have a current approved revision, a job suggestion is created in the new/change order queue to help ensure requirements are not lost.

## Scheduling and Resource Management

Multiple resource views and online scheduling tools such as the change impact informer offer the master scheduler

and manager the ability to visually locate overload problems and slack conditions, then perform cost and throughput analysis on schedule changes before they are firmly committed. Scheduling & Resource Management functionality includes:

## Production Scheduling Board

Easily manipulate the schedule with drag- and-drop and drill-down techniques for multilevel assemblies and operation details. A main control center for scheduling resources graphically displays schedules by job, resource, resource group, or entire plant. Dynamically change the timeline of the view to see short- run operations and quickly analyze the impact of long running operations.

## Alerts

View indicators, such as late status and material availability, to proactively alert the master scheduler to potential problems in the schedule. Optionally customize colors to denote actual, what-if, or delinquent load by job or operation.

## Finite Scheduling

Schedule and reschedule with flexible, finite real-time schedule capabilities for a single job and plant-wide global finite capacity. Features include job locking for key operations or jobs, user-defined priority, and capacity load leveling by resource and resource group.

## Drag-and-Drop

Drag-and-drop scheduled load hours forward or backward to effectively alleviate fall overload conditions at critical resources or resource groups.

## Operation Complete Quantity and Complete Time Displayed

The Job Scheduling Board, Resource Scheduling Board, and Multi-Resource Scheduling Board all have an Operation Complete Quantity field on their Detail sheets. This field displays the number of parts that have been completed on the current operation. Both the Job Scheduling Board and Resource Scheduling Board display the Operation Complete Time value after you move an operation. This shows you the amount of time that is left to complete the operation.

## Overload Informer

Display each date and resource/resource group, where scheduled hours exceed capacity based on what-if or actual job schedules. Access resource, resource- group, and job scheduling information to review the causes of an overload and make schedule changes as needed.





### Multilevel Assemblies

Manage complex assemblies by matching the schedule to actual production output. From branch- and component-level rescheduling to final assembly, Kinetic helps to ensure that all components are on time and that nothing slips through the cracks. Visually explode high-level components to view lower-level component schedules.

### Schedule Multi-Job

The Scheduling Multi-Job option allows you to schedule a group of associated jobs as if it were a single job. Jobs are associated via make-to-job relationships. This makes it possible to schedule and re-arrange manufacturing jobs for a parent assembly and its child subassemblies (called predecessor and successor jobs) all at the same time. This allows the scheduling planner to easily manage linked jobs to help ensure that they are scheduled together so that all demands were met to meet customer requirements.

### What-If and Change Impact

Schedule jobs in a what-if mode, with the ability to analyze potential bottlenecks before finalizing the actual schedule. View the potential changes for cost and throughput to the schedule after creating what-if scenarios.

### Setup Grouping

Use setup groups to streamline your setup processes. Dynamically assign grouping based on the criteria you define.

### Capabilities with Zero Priority

When you schedule by capability, the Scheduling Engine selects resources by the priority value defined for each

capability. You can assign a zero value to a capability's priority. Any resource that is defined by this zero priority will not be selected by the Scheduling Engine. It will, however, be available to use as a resource on the Start Activity or Labor Entry windows.

### Dual Resource Constraints

Use a secondary resource constraint (e.g., a tool or employee) in addition to the primary resource in finite capacity scheduling.

**Note:** The Advanced Planning and Scheduling module provides the ability to use more than two resource constraints.

### Conditional Forward Schedule

Optionally allow the system to perform a forward schedule based on a start date of today when performing a backward schedule if a current date is encountered.

### Resource Group

Define an unlimited number of resources within a resource group. Resource groups can be used in the planning process with the actual resource assigned automatically based on availability of individual resources. Resources may have unique calendars, and values for hourly/daily capacity, queue- and move-time.

### Finite Load Horizon

Prevent the schedule from making adjustments too far into the future— potentially impacting material purchases and resource allocations—with finite load horizons (e.g., time fences or cutoff dates) for finitely scheduling load on the resource.

## Resource-Based Schedule

Develop a schedule for each individual resource deployed in the schedule.

## Reschedule Delta

Optionally automate the system's response to parts that are planned to be early or late by a threshold number of days.

## Rough Cut Scheduling

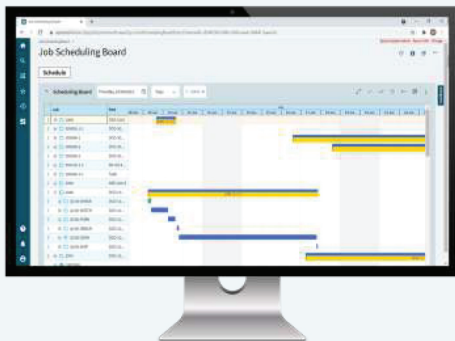
Keep an eye on the future with Rough Cut Scheduling which shows future production without taxing system resources.

## Scheduling Factor Send Ahead

Start-to-start scheduled operations or operations scheduled to begin at the same time can be staggered based on an offset factor that is calculated by number of pieces or a percentage of time allocated.

## Scheduling Blocks

Account for periodic processes with scheduling blocks. Scheduling blocks define periodic setup needs such as tool changes or other processes.



*Scheduling and Resource Management—Manipulate the schedule directly from a sophisticated, drag-and-drop visual scheduling board.*

## Material Constraints Displayed

Both the Multi-Resource Scheduling Board and the Job Scheduling Board indicate which materials are constrained. On both scheduling boards, the Related Materials grid contains columns that display this information. One column indicates whether or not the material is constrained. The other columns define the purchase order, job, and lead time linked to the constrained material.

## Advanced Planning and Scheduling

Available as an extension to Scheduling, Advanced Planning and Scheduling incorporates the strength of

the Scheduling engine and enhances it with advanced functionality such as multiple constraint scheduling, a wide range of scheduling methods, visual drag-and-drop scheduling, capability and dependent capability-based scheduling, real-time capable-to-promise functionality, and advanced material planning functionality.

## Capable-to-Promise

Easily manage customer expectations with real-time capable-to-promise functionality in Order Management. Epicor capable-to-promise uses the scheduling engine to determine accurate promise dates and offers order processing single-click confirmation or order cancellation based on the projected due date.

## Multiple Resource Scheduling Board

Easily manipulate the schedule with drag- and-drop manipulation and drill-down techniques for multilevel assemblies and operation details. A main control center for scheduling resources graphically displays schedules for a group of resources in one screen. Dynamically change the timeline of the view to see minute operations and quickly analyze the impact of long running operations. Add memos to a schedule on the Multi-Resource Scheduling Board about any aspect of a current schedule.

## Multiple Constraints

Set up every operation with multiple constraints or resources (e.g., machines, tools, skilled labor, raw materials, or available subassemblies).

## Resource Eligibility

Define resources within a specific resource group with individual characteristics to improve scheduling accuracy.

## Automated Scheduling by Capability

Define a capability or skill level that can be tied to multiple resources rather than a resource group or individual resource in the planning process. The APS engine then determines, based on the available resources, which individual resource to schedule for the operation.

## Dependent Capabilities

Link dependent capabilities that the scheduling engine schedules along with the primary capability when operations require dependent skills to perform the operation.

## Finite or Infinite Capacity

Define each resource with either finite or infinite capacity. When a piece of the schedule is moved, the resource is rescheduled according to its type.



**Minimum WIP Scheduling**

Use a unique scheduling algorithm designed to minimize work in process by scheduling a job to ship as early as possible. APS then back schedules to start working on the job as late as possible.

**Dimensional Planning**

Schedule by volume and quantity using dimensional planning that is not time constrained.

**Rate-Based Scheduling**

Schedule cells based on production throughput rates rather than time.

**Material Constraints**

Consider material availability as a scheduling constraint. Integrated directly with Inventory and Purchasing, the APS system knows when material is due and schedules accordingly.

**Advanced Material Planning**

Increase throughput by considering material and component availability as a constraint. Advanced material planning, an integral feature of APS, facilitates intelligent stocking and procurement of material requirements. The schedule function recognizes materials earmarked as constraints, gives the master scheduler material availability, and considers supplier calendars for a more realistic schedule.

**Change Impact Analysis**

See the immediate impact of proposed changes on other orders to make informed decisions about desired changes.

**Time Adjustment**

Automatically take into account resource utilization and resource group efficiency for more accurate load calculation.

**Optimization Rules**

Generate a schedule based on rules assigned to individual resources.

**Balanced Optimization**

Concurrently consider priority, slack time, and setup time when determining load balance

**Single Cell Scheduling**

Schedule an entire job or assembly within a single work cell.

**Unlimited What-If**

Create unlimited what-if scenarios to view the effect of changes on your shop floor.

**Multi-Plant Communication**

Help to ensure that interdependent plant schedules are coordinated.

**Multisite Management**

Not only are manufacturers and distributors looking for new tools to oversee multiplant operations, but they're also looking to maximize the use of existing resources. Alternative production methods management helps optimize the production processes for specific parts in each plant, based on the resources available. Another optimization tool includes the transfer of material or semi-finished components to another plant for completion.

**Note:** Learn more about Multisite Management in the [Global Business Management](#) chapter.

