



Aspen Distribution Scheduler

Schedules product movements between plants, distribution centers & customers while maintaining network inventories and optimizing distribution costs.

The Challenge

Aspen Distribution Scheduler seeks to address a fundamental issue facing every inventory manager... how much product must be shipped, what is the optimal location to source from and what is the best way to deliver it to the customer? Traditional and ERP-based solutions for distribution requirements planning employ simplistic logic for creating distribution plans that do not adequately consider important constraints. These approaches use basic pre-scripted calculations that are very similar to the MRP logic used to compute plant raw material requirements. Although these approaches may create plans that are feasible from an execution point of view, they fail to consider all the trade-offs available to the business in the near-term resulting in poor distribution asset optimization, higher costs, and sub-optimal customer service levels. Basically, these solutions leave money on the table.

AspenTech's Distribution Scheduler solution employs a combination of mathematical optimization techniques and heuristics to enable you to tackle these challenges in a way that improves inventory turns, minimizes system-wide costs, and optimizes customer service levels. Unlike ERP or other systems, this solution allows you to make the most profitable decisions before making and shipping the product, rather than force limiting business practices like single-sourcing that encourage reactive practices to meet demand.

Solution Overview

Aspen Distribution Scheduler creates the lowest cost distribution schedule considering all relevant data throughout your organization. AspenTech utilizes a role-based display architecture to permit access to the solution by a wide group of individuals while simultaneously preserving the integrity of the solution.

A sound distribution schedule is first based on an accurate and complete understanding of the current situation across the network. Periodically the relevant data in Aspen Distribution Scheduler is updated using AspenTech's enterprise synchronization process.

Synchronization ensures that the most accurate information is used when generating a distribution schedule. Examples of data include: Current Distribution Status, Starting Inventory levels, Inventory Targets, Location Transportation Preferences, Lead Times, Transportation Costs, Vehicle loading and unloading costs, and much more.

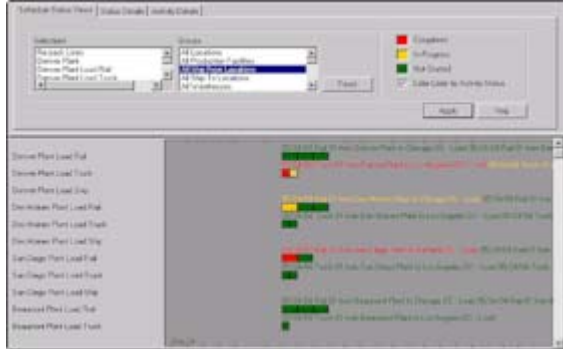
The current status is a direct input into the optimization engine leading to a truly optimized distribution schedule.

Key benefits

- Creates optimal distribution plans considering all relevant factors.
- Distribution scheduling for bulk shipping – focuses on mode selection and sourcing, ideal for chemical companies.
- Distribution scheduling for packaged goods shipping – focuses on load consolidation. Ideal for CPG companies. Minimizes distribution costs by matching supplying and consuming sites considering all costs and replenishment needs simultaneously.
- Improves utilization of distribution assets by minimizing distribution costs and increasing inventory turns.
- Improves customer service levels.
- Lowers transportation costs (less premium freight required)
- Powerful analysis capabilities allow users to conduct and compare different scenarios.
- Creates daily replenishment plans that can be integrated with ERP systems, Transportation Management systems, and Rail Car Management systems
- Improves enterprise visibility to the distribution network fostering better decision-making.
- Seamlessly integrates with the Aspen Supply Chain Suite

Distribution Schedule Status

On demand, users can quickly see the status of the current distribution schedule. Activity color codes make it easy to understand the status of each shipment. In the example below red indicates completed activities (shipments), yellow activities are *in-progress*, green haven't been shipped yet but are scheduled to be shipped today. This intuitive display method enables user's to quickly identify problems that may require manual intervention.



Multiple views and data are available of the status display via selection:

- View individual locations or groups of locations
- Compare the difference between Scheduled and Completed shipments.
- Show Scheduled Shipment Times
- Show Actual Shipment Times
- Display the difference in days between the scheduled and actual shipment times.
- Flow of material across your distribution network



In the display to the left, the Trace option has been enabled to show the detailed flow of shipments between locations. Views can be filtered by any number of criteria such as product, ship-from or ship-to location, or transportation mode.

Distribution Schedule Generation

Aspen Distribution Scheduler includes a powerful optimization center employing **state-of-the-art search optimization techniques, Heuristics, Linear Programming, and Mixed Integer Programming** to generate an optimal distribution and replenishment plan. The benefit of such a vast set of optimization techniques is that this approach enables the Distribution Scheduler to find an optimal or *best possible* solution — as opposed to *better than we can do by hand* or *better than we've done in the past*.

In certain situations, the inventory manager may need to override the existing solution. For example, suppose you would like to schedule a shipment one day earlier than originally planned. The Solution Override Screen allows you to change the timing of shipments, to change quantities of materials in shipments and to change ship-from or ship-to locations.

Additional Optimization Features:

- Optimization can be run on entire distribution network or user-selected portion
- Penalty or Cost factors are considered for early, late, and on-time shipments
- Determines all items and locations that will need replenishments within the schedule horizon.
- Supplying and consuming sites are matched by finding the lowest cost sources and considers all replenishment needs simultaneously.
- Produces a daily bucketed replenishment plan showing total quantities of material that need to move between all distribution nodes.

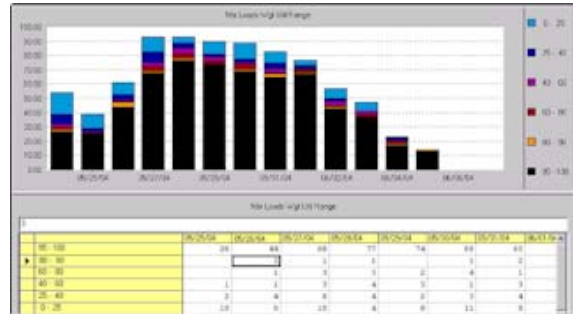
Powerful Analysis Capabilities

Have you ever wondered just how good your distribution plan is? Or what the effect of a few changes would make on overall profitability? Aspen Distribution Scheduler removes the guesswork by providing powerful analysis tools. With these tools you can test different scenarios, compare scenario results, and choose the plan that best addresses your issues at hand.

The figure to the right shows an analysis of truck loads shipped from one location. In this case the vast majority of trucks are filled to 95% capacity or more minimizing transportation costs.

More than six standard methods are available to analyze load optimization:

- Vehicle Details
- Load Histograms
- Vehicle Utilization
- Weight and Volume Utilizations
- Number of Different Materials Per Load
- Materials Per Load



Distribution flows are often difficult to understand. Aspen Distribution Scheduler depicts distribution flows in map format. Choose from multiple filter options such as: Time Period, Location, Mode, Product, or Load ID to narrow the distribution flow view.

Note: You can right click on any location in the map on the left to display a report with details, such as materials and the volumes shipped in and out of the selected location

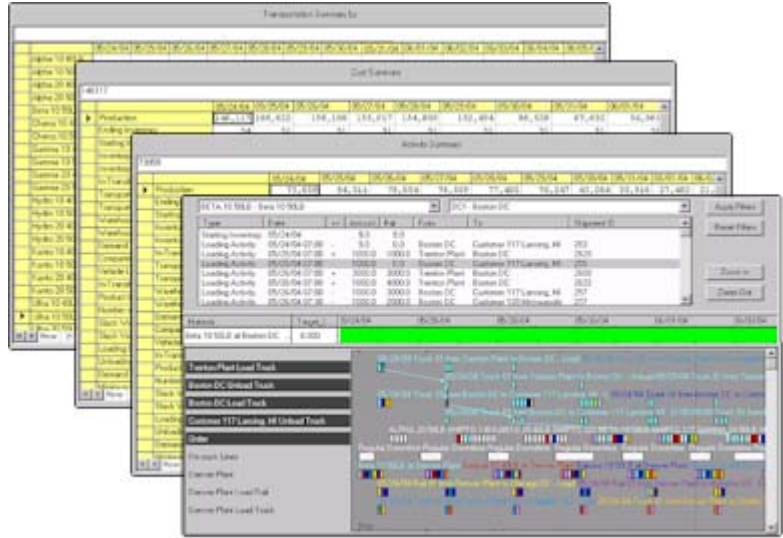
Aspen Distribution Scheduler incorporates a powerful scenario management and comparison function. With this function you can compare the consequences of potential changes in the distribution network, unplanned downtime, adding or reducing capacity, or changes in policy options such as inventory targets. When comparing scenarios, the Distribution Scheduler updates all the reports to reflect the difference between the scenarios. To quickly identify the optimal scenario, many reports can display the differences such as the Summary Reports, Replenishment Plan, Vehicle Detail, Shortages and all Labor reports.

Customizable Reports

Aspen Distribution Scheduler boasts powerful reporting capabilities. Template style reports are easily modified to meet organizational requirements. Reporting formats include tabular data, bar charts, and graphs.

Report Examples:

- Profit Summary – Marginal profit summary based on solution activity, ignoring penalty costs or activity incentives (unless they are built into the actual costs). The capacity cost of the fixed early period production is not counted.
- Activity Summary – Overall summary of quantities for all major plan results by time period
- Inventory report in days, weeks, and months
- Cost Summary – Overall summary of costs for all major plan results by time period. Includes everything in the Profit Summary plus all penalties and incentives.
- Inventory Summary – Projected inventory levels for each material by time period.
- Transportation Summary by Product – Summary of total transported product in each time period.
- Detailed Replenishment Report - The Replenishment Plan Report shows the total amount (in demand units) of material transported –slice-and-dice by to/from location, transport mode, vehicles, compartments, material time period and other attributes.
- Labor Reports, Shortage Reports, and more.



Feature Summary

<i>Considers all relevant factors in creating a replenishment and distribution plan</i>	<ul style="list-style-type: none"> • Generates an optimal plan because all factors are consider including: Starting and in-transit inventory, Safety stock, Material Availability, Demand/Shipping/Receiving constraints, Capacity constraints, and Transportation equipment constraints • Uses a combination of mathematical optimization, heuristics, and analyst overrides to create the optimal distribution plan.
<i>Minimizes distribution costs</i>	<ul style="list-style-type: none"> • Simultaneously locates the lowest cost sources and matches them with consuming sites.
<i>Utilizes multiple analysis tools</i>	<ul style="list-style-type: none"> • Provides reports and graphical representations for the various inventory categories and levels. The reports and graphs support an analysis function to provide the user with review capabilities before publishing the data. Bar charts, line charts, stacked bar, stacked line (area). • List of analysis tools available: forecast information, forecast methods analysis, forecast accuracy, gap analysis, budget analysis and net forecast exceptions.
<i>Improves visibility of inventory levels and demands</i>	<ul style="list-style-type: none"> • The Planning Board graphs inventory levels and demands over the planning horizon, giving the scheduler an intuitive grasp of these factors. • The scheduler can quickly ascertain where problems lie, such as stock outs and overruns.
<i>Analyzes different scenarios</i>	<ul style="list-style-type: none"> • Execute multiple “what-if” scenarios and determine the best distribution plan. • Provides comparison of different scenarios.

<i>Produces a daily bucketed replenishment plan</i>	<ul style="list-style-type: none"> The detailed replenishment plan describes, on a daily basis, the total quantities of material that need to move between all distribution nodes
<i>Easily customizable reports</i>	<ul style="list-style-type: none"> Reports are easily customized for each function or department. Examples include exception reports, consumption,
<i>Pre-configured Integration</i>	<ul style="list-style-type: none"> Easily integrates with the client's ERP and legacy systems. Tightly coupled integration with SAP Seamlessly integrates with other AspenTech applications.
<i>Linked to Aspen Supply Chain Suite</i>	<ul style="list-style-type: none"> Links to other elements of the Aspen Supply Chain Suite such as Aspen Collaborative Demand Management and Aspen Capable-to-Promise. This process removes wasteful and expensive lead-time from the scheduling/execution process, reducing costs throughout the value chain.

About AspenTech

Aspen Technology, Inc., provides industry-leading software and implementation services that enable process companies to increase efficiency and profitability. AspenTech manufacturing/ supply chain product line allows companies to increase margins in their plants and supply chains, by managing customer demand, optimizing production, and streamlining the delivery of finished products. Its engineering product line is used to design and improve plants and processes, maximizing returns throughout an asset's operating life. These two offerings are combined to create solutions for enterprise operations management (EOM), integrated enterprise-wide systems that provide process manufacturers with the capability to dramatically improve their operating performance.

Over 1,500 leading companies already rely on AspenTech software, including 46 of the world's leading chemical companies. For more information, visit www.aspentech.com.



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