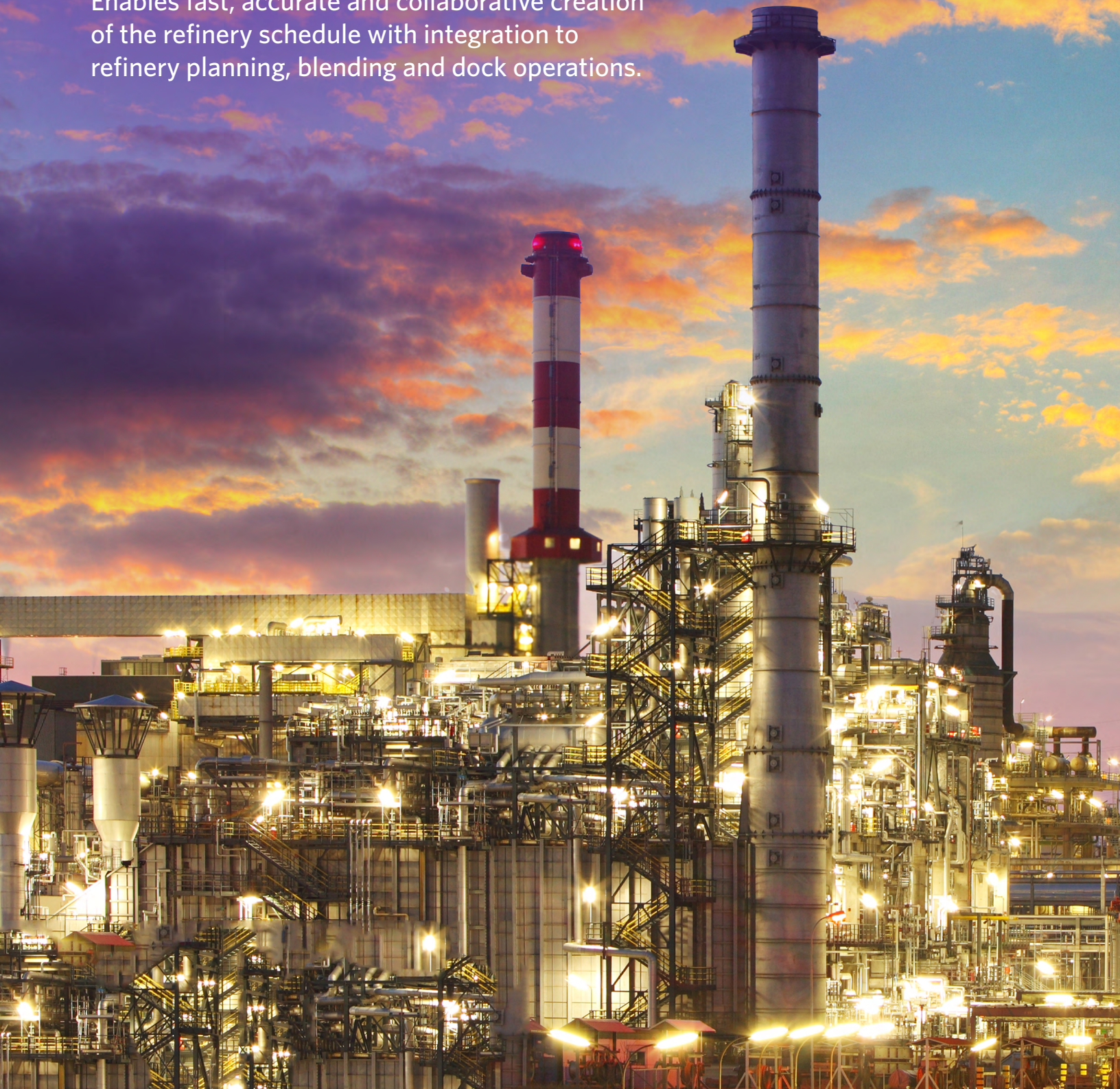


## Aspen Petroleum Scheduler™

Enables fast, accurate and collaborative creation of the refinery schedule with integration to refinery planning, blending and dock operations.





Aspen Petroleum Scheduler is an integrated system that supports comprehensive scheduling and optimization of refinery activities, including new dock scheduling. Since 1995, Aspen Petroleum Scheduler has provided a critical link between the refinery planning process and operations, helping customers across the globe achieve better operational alignment with the plan, which helps to prevent margin leakage in a volatile, competitive market.

## The Challenge: Executing the Plan More Efficiently

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Scheduling automation provides the key bridge between an optimal plan and operational execution. A significant challenge for schedulers is to execute the plan profitably while respecting refinery constraints. Today's schedulers are dealing with a dynamic environment, fewer staff and increasingly complex, flexible supply chains.

## The AspenTech Solution: Schedule All Activities From One Platform

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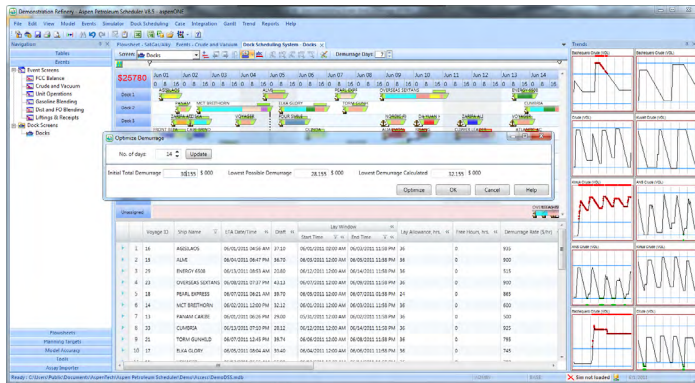
Aspen Petroleum Scheduler is an event-based, single-blend optimization solution that supports the scheduling of all refinery activities for over 45% of global refineries. It integrates with Aspen PIMS™ to achieve greater profitability through more accurate planning and scheduling. For optimized blending, Aspen Petroleum Scheduler integrates with Aspen Refinery Multi-Blend Optimizer™. This comprehensive approach to planning, scheduling and blending yields customer savings.

Aspen Petroleum Scheduler extends beyond the refinery gate to include dock operations and pipeline movements for a more comprehensive view of the refinery schedule. The dock scheduling feature within Aspen Petroleum Scheduler manages all incoming and outgoing shipments, all the way down to the docks, while automatically creating and updating events within the refinery schedule. The new pipeline scheduling functionality enables more accurate tracking of incoming and outgoing movements via pipelines, including ancillary terminals that are critical to efficient operational scheduling. For optimized pipeline fill management, Aspen Petroleum Scheduler easily manages multiple, parallel and bi-directional pipeline segments with injection points.

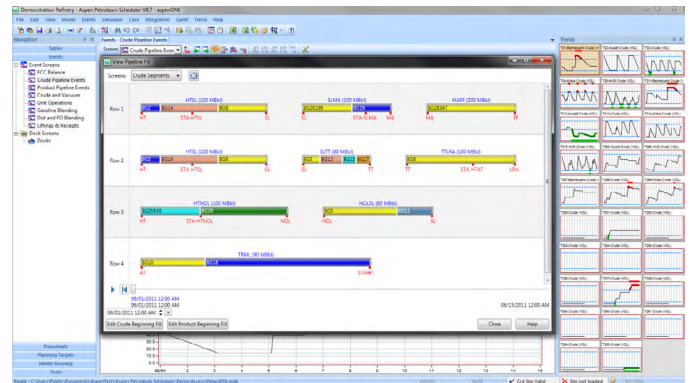
By coordinating scheduling for all refinery activities, Aspen Petroleum Scheduler helps companies:

- Improve manufacturing efficiency
- Reduce quality giveaway, inventories and demurrage
- Shorten shutdown and startup cycles
- Better evaluate opportunities
- Narrow the gap between planning and scheduling
- Reduce runouts and unplanned incidents

Aspen Petroleum Scheduler is designed to maximize scheduler productivity by reducing the amount of time the scheduler spends assembling and validating data required for scheduling. Aspen Petroleum Scheduler shares production targets, assay data and submodels, blend model libraries, optimum recipes, and more with industry-leading Aspen PIMS.



Dock scheduling in Aspen Petroleum Scheduler optimizes demurrage while managing incoming and outgoing shipments.



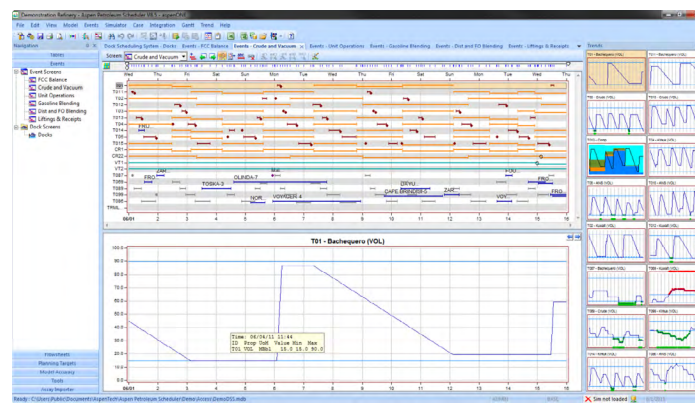
Pipeline scheduling in Aspen Petroleum Scheduler enables management of multiple and bi-directional segments with injection points.

## Multi-User Collaborative Scheduling

To support teams of schedulers, Aspen Petroleum Scheduler allows multiple users to work simultaneously on schedules. Users share the same view of the refinery schedule, which improves coordination between schedulers and with other departments. Aspen Petroleum Scheduler manages schedule changes and alerts all schedulers when a change is made. An intuitive, easy-to-use graphical environment supports scenario analysis with visualization of potential changes and their impact on operations. Aspen Petroleum Scheduler is also internationalized and can be used in a local language.

In addition to improving coordination, scheduling in a multi-user environment offers:

- Best practice business processes that can be easily replicated within and across refineries
- Faster response to issues and opportunities
- Knowledge capture from experienced schedulers that can be easily shared with new employees



Gantt charts with associated trends provide an effective view to monitor and update schedules.

## Integrated Planning, Scheduling and Blending

Aspen Petroleum Scheduler provides a comprehensive model of the entire plant along with tools that make it easy to maintain the model. Aspen Petroleum Scheduler and Aspen PIMS can share common assays, production targets, process unit representations, and blending correlations. This common model approach allows Aspen Petroleum Scheduler implementations to be quickly completed using Aspen PIMS assays and process unit representations. The model integration also allows schedulers to focus on scheduling since maintaining the assays, process units and blending correlations can be completed within Aspen PIMS.

Overall, this integration reduces model maintenance and improves accuracy. Aspen Refinery Multi-Blend Optimizer provides built-in blending integration by using the same database structure as Aspen Petroleum Scheduler. Blending and shipping events—including blends, product shipments and receipts, and tank-to-tank transfers—can be entered or modified in either product. As with the planning integration, the result is inherent data and model synchronization with reduced model maintenance.

Function	Benefit
<p><b>Event-based scheduling</b></p> <ul style="list-style-type: none"> <li>Calculates the refinery schedule as a series of events, with significant granularity</li> </ul>	<ul style="list-style-type: none"> <li>Properly reflects the sequence of events in the schedule</li> <li>Provides compatibility between longer term planning (30-60 days) and shorter term scheduling (1-7 days)</li> </ul>
<p><b>Multiple-user operation</b></p> <ul style="list-style-type: none"> <li>Database architecture provides multi-user capability internationalized for easy localization configuration and facilitates integration with other applications</li> </ul>	<ul style="list-style-type: none"> <li>Makes it easy for schedulers to coordinate activities within their group and with other departments (e.g., logistics, marketing)</li> <li>Enables schedulers to respond faster to issues and opportunities</li> <li>Streamlines the scheduling process</li> </ul>
<p><b>Dock Scheduling</b></p> <ul style="list-style-type: none"> <li>Align the schedule with logistics to easily accommodate berth availability, physical constraints and available products storage</li> <li>Easily manage incoming and outgoing shipments all the way down to the docks, while automatically creating and updating events in the refinery schedule</li> </ul>	<ul style="list-style-type: none"> <li>Reduces demurrage costs by as much as \$60,000 USD per day for a single supertanker</li> <li>Prevents product downgrades and unplanned product blending</li> <li>Enables users to quickly resolve potential conflicts and manage tankage issues</li> <li>Eliminates the need for spreadsheets that are inadequate for managing dock operations</li> </ul>
<p><b>Pipeline Scheduling</b></p> <ul style="list-style-type: none"> <li>Easily manage multiple and bi-directional pipeline segments with injection points and pipeline fill management</li> <li>Track crude and product movements via pipelines</li> <li>Manage in-transit inventory to assist material balance management outside the refinery fence, including ancillary terminals</li> </ul>	<ul style="list-style-type: none"> <li>Accurately tracks inbound and outbound movements via pipelines</li> <li>Enables more accurate crude unit scheduling</li> <li>Allows planning for product shipments to outbound terminals with accuracy</li> <li>Eliminates the need for spreadsheets and other external pipeline scheduling tools</li> <li>Enables modeling of the refinery schedule to include ancillary terminals</li> </ul>
<p><b>Interactive graphical user interface (GUI)</b></p> <ul style="list-style-type: none"> <li>Enables ease of use with components such as the model tree, flowsheet simulator, and event interface</li> <li>Microsoft Excel® import utility allows data to be manipulated in Microsoft Excel and quickly updated</li> </ul>	<ul style="list-style-type: none"> <li>Reduces the time required to build a detailed schedule</li> <li>Allows for faster and easier model updates</li> <li>Provides accurate representation and prediction of refinery performance</li> </ul>

### Scheduling approaches and automation

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- Incorporates the typical approaches to scheduling, simulation and linear programming
- Offers ability to include logic calculations using built-in logic authoring capability or Microsoft tools
- Enhanced Microsoft Excel synergies facilitate multiple event editing
- Provides users with the flexibility to quickly create a schedule that meets equipment constraints, feedstock availability and product lifting requirements
- Increases productivity by automating both routine and complicated decision tasks
- Increases ease-of-use and productivity while saving time

### Reporting and solution analysis tools

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- Includes pre-defined and configurable reports, based on Microsoft Access® and Microsoft Excel
- New Microsoft Excel editing capabilities streamline changing, adding or deleting events and supports bulk editing
- Creates and compares multiple cases that represent different operations of the refinery
- Makes it easy for schedulers at all levels to interpret schedule results
- Increases productivity and enables schedulers to make better and faster decisions
- Provides “what-if” analysis to help schedulers determine the best schedule given forecasted changes in prices and operating parameters

### Aligned with industry and IT standards

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- Supports XML formats and is aligned with the ISA S95 standard
- Supports Microsoft Access, Microsoft SQL Server® and Oracle® databases
- Lowers total cost of ownership by integrating with existing IT infrastructure

AspenTech is a leading supplier of software that optimizes process manufacturing — for energy, chemicals, engineering and construction, and other industries that manufacture and produce products from a chemical process. With integrated aspenONE® solutions, process manufacturers can implement best practices for optimizing their engineering, manufacturing, and supply chain operations. As a result, AspenTech customers are better able to increase capacity, improve margins, reduce costs, and become more energy efficient. To see how the world's leading process manufacturers rely on AspenTech to achieve their operational excellence goals, visit [www.aspentech.com](http://www.aspentech.com).

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