



 Brochure

# Aspen Unified™

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## Overview

Aspen Unified is the next-generation planning, scheduling and yield accounting solution from AspenTech, the world's leading provider of planning and scheduling solutions—Aspen PIMS-AO™ and Aspen Petroleum Scheduler™. Aspen Unified enables companies to increase margins and save time by coordinating siloed business processes for better efficiency across the value chain.

Planning, scheduling, yield accounting and dynamic optimization are supported in one consistent web-based environment with an intuitive look and feel, flowsheet environment, common model, data components and powerful integration. This reduces the gap created by inefficiencies in implementing optimal plans to operations. Adaptive technologies such as advanced process control (Aspen DMC3™) and dynamic optimization (Aspen GDOT™) pass changing model parameters and constraint information back to planning and scheduling. This feedback, along with predictive maintenance from Aspen Mtell® and AI/first principles hybrid models in Aspen HYSYS®, further enable moving operations closer to the optimal plan.

# Expected Benefits of Aspen Unified



## Increase margins significantly

- Align plan, schedule and execution
- Enable agile and robust decision-making
- Prevent errors by sharing data seamlessly
- Enable more profitable integration between refining and chemicals units
- Allow companies without scheduling models to adopt scheduling easily by leveraging existing planning models



## Reduce emissions

- Model CO<sub>2</sub> and other GHG emissions plus emissions trading/taxation schemes
- Set limits on CO<sub>2</sub> to ensure compliance to sustainability targets
- Understand effects of feedstock and operational changes on sustainability metrics
- Model biofeedstocks and track certification of bio-products
- Accurately report emissions for audit and compliance purposes



## Save up to 1000 staff-hours per year

- Save up to 200 staff-hours per year by reducing time and effort on model maintenance and management with new and improved workflows
- Save up to 1000 staff-hours per year per scheduler by automating data reconciliation and first-pass feasible schedule creation
- Train new users much faster



## Reduce total cost of ownership up to 75%

- Deploy on a server or in a public or private cloud: typically 25–50% less expensive than powerful desktop computers
- Lower hardware costs with a device- and platform-agnostic solution
- Save IT cost on software upgrades using cloud or server installation



## CHALLENGE

### **Siloed systems are difficult to maintain and can result in lost opportunities.**

Miscommunication between different groups in the plant, such as planners, schedulers and operators, can lead to errors resulting in margin leakage. As plant operations and conditions change over time, models need to be updated to stay accurate.

### **Customers want an easy-to-use, intuitive interface and workflows.**

The leading planning solutions from AspenTech, Aspen PIMS and Aspen PIMS-AO, are among the most established tools in the refining and petrochemical industries. With the prevalence of digital technology, users expect software to be easy to use and understand, with minimal training to be effective.

## SOLUTION

### **Aspen Unified simplifies these problems by combining models and data into one source.**

- Production planning and scheduling can use the same master data (e.g., streams, components, blends, etc.), submodels (e.g., reactor yields) and assay data.
- Synchronize operational constraints from APC/Aspen GDOT with planning and scheduling in real time to ensure that models reflect actual plant conditions.
- Easily collaborate in a web-based environment.
- Ensure higher accuracy with Hybrid Models that combine first principles with AI.
- Leverage validated and reconciled data to make better planning and scheduling decisions.
- Companies without scheduling models can more easily adopt them using their Aspen Unified PIMS models, enabling higher margins, more stable operations and agile responses to unplanned events.

### **Aspen Unified combines an intuitive user interface, modern web-based architecture and data visualization tools for more efficient and powerful analysis.**

- Faster to learn and train new users—expected savings of at least one staff-week per new user trained
- Manage cases more intuitively—drag and drop, parent-child, copy/paste and automated case set creation
- Better understanding of the results through flowsheet and quick data visualization





## CHALLENGE

### **Technological advances are not used to full potential.**

With high-performance computing, planning can be transformed into a big data exercise. Running hundreds or thousands of cases in a reasonable timeframe is now possible.

## SOLUTION

### **Aspen Unified PIMS uses the latest hardware to deliver unmatched speed and allows you to keep working while the model solves.**

- Cloud computing provides dramatically faster performance.
- Users can keep working while cases run, enabling real-time interaction with the results and better data analysis.

# Increase Profits and Reduce Carbon Emissions through Collaboration

## Technology: Aspen Unified

### Key Capabilities

- AspenTech's proprietary solver for complex refinery and chemical process problems is consistently proven more robust and reliable than any other commercially available solver (such as FICO XSLP)<sup>1</sup>
- Simplified user interface enables new users to learn the tool faster than ever
- Multi-user enterprise environment improves security and change tracking of business-critical, economic decision-making data
- Dynamic reports, which automatically update with new results, are shareable with others via a quick URL link
- Common data and model library streamlines model updates and prevents costly errors
- Cloud deployment options—on-premise, virtual private cloud, or hybrid

### Key Benefits

- Enable better business results
- Analyze more scenarios with speeds up to 100 times faster and cloud-enabled parallel processing
- Predict and optimize the tradeoff between emissions and profits
- Save time, money with easy software deployment and upgrades, a centralized infrastructure and automated model migration
- Train new users up to two times faster

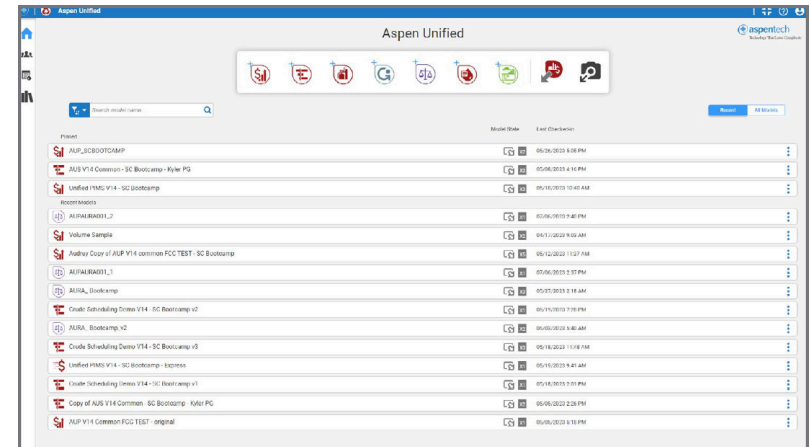


Figure 1. Aspen Unified home page, with apps and recent models.

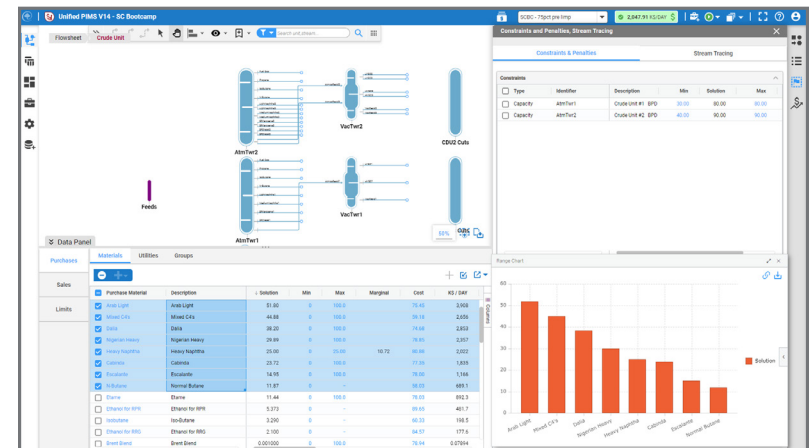


Figure 2. Aspen Unified PIMS flowsheet and quick right-click graphing.

<sup>1</sup>AspenTech regularly evaluates the best commercial and academic non-linear solvers to see how they compare to the AspenTech proprietary non-linear solver.

# Production Planning

## Technology: Aspen Unified PIMS

### Key Capabilities

- **NEW AI agent**, Aspen Virtual Advisor, or “AVA”, enables better understanding of model results, such as marginal values and constraints
- Flowsheet interface to build, edit, visualize, and understand your planning models and results
- Automatic pricing and sensitivity analysis tools
- Streamlined model management workflow including check in/out, live sharing and change tracking
- Easy plug-and-play integration with business intelligence tools such as Microsoft Power BI
- Automatic import and conversion of existing PIMS-AO model to Aspen Unified PIMS
- Automatic data imports from third-party sources via flexible web APIs

### Key Benefits

- Enable better business decisions with the proprietary AspenTech solver
- Increase margins significantly<sup>2</sup>
- Save time each day with automation tools
- Solve up to 100 times faster with cloud-enabled parallel processing

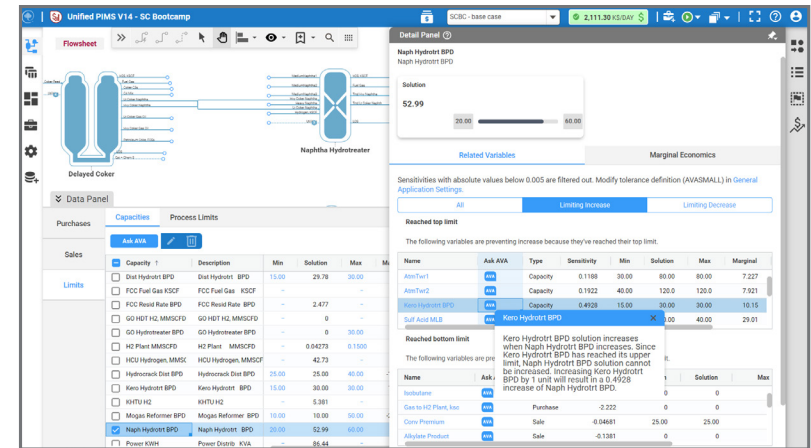


Figure 3. Aspen Virtual Advisor (AVA) for Unified PIMS™, showing increase in naphtha hydrotreater rate.

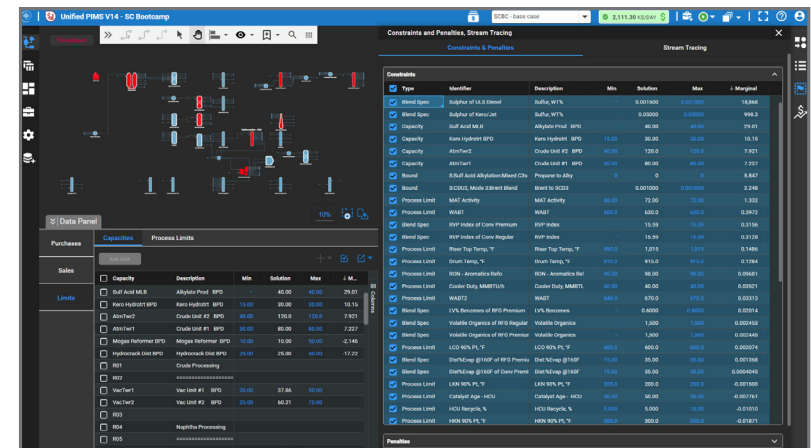


Figure 4. Flowsheet with constraints panel in dark mode.

<sup>2</sup>Contact AspenTech for a benefits estimate



# Production Scheduling

## Technology: Aspen Unified Scheduling

### Key Capabilities

- Full refinery and olefins scheduling— *now with blending optimization*
- Enable collaboration across teams with true multi-user scheduling
- Improved Gantt chart and flowsheet
- Integration across Unified imports plan from Aspen Unified PIMS and compares plan vs schedule vs actual trends
- **NEW** Automate the creation of a new feasible crude schedule using **Industrial AI** that learns from past schedules to initialize the schedule
- Automate the reconciliation of yesterday's schedule with plant data
- Automate other tasks with provided logic and custom scripts
- Directly compare two options (cases) in the schedule

### Key Benefits

- Increase margins up to 3%
- Save time with automation
- Enable crude and blend optimization
- Enable more stable refinery operations by reducing changes

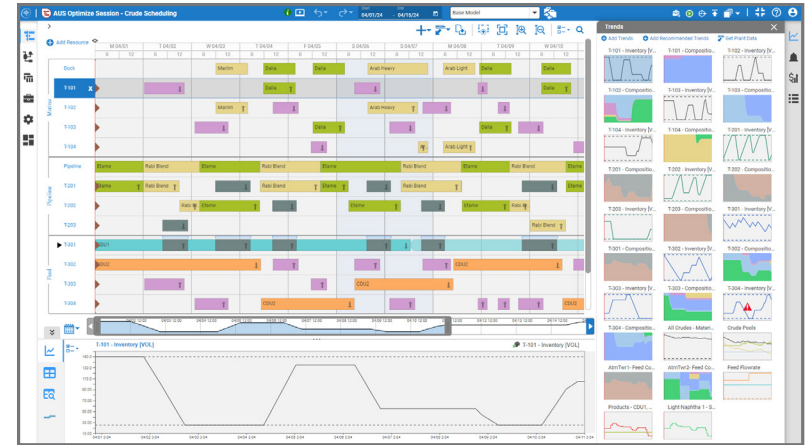


Figure 5. Aspen Unified Scheduling Gantt chart home screen with stock chart panel.

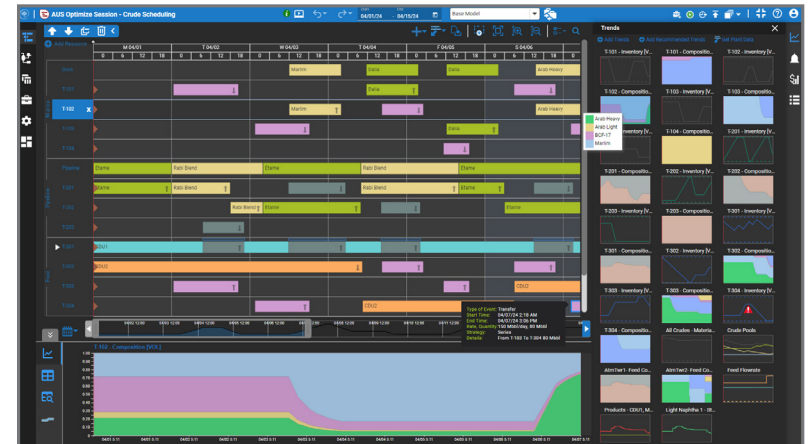


Figure 6. Aspen Unified Scheduling crude composition chart in dark mode.



# Value Chain Optimization

## Technology: Aspen Unified Multisite for PIMS™

### Key Capabilities

- Optimize supply, production, demand, sourcing and transportation across multiple refineries and terminals (depots) in a region
- Integrate Petroleum Supply Chain Planner (PSCP) distribution models with Aspen Unified PIMS/Aspen Unified Multisite for PIMS
- Visualize planning results using maps, graphs and tables
- Easily link and send data such as constraints or inventories from individual models to the global model
- Evaluate business opportunities such as entering new geographic markets, creating new products, using new terminals and more

### Key Benefits

- Increase margin by selecting optimal production locations and feedstock sourcing—gain 10 to 50 cents per barrel or up to \$50M per year
- Reduce supply cost by optimizing freight and inventory usage
- Reduce cost of rush shipments and demurrage from better planning
- View the entire value chain to reduce disruptions from unplanned events, like hurricanes or typhoons

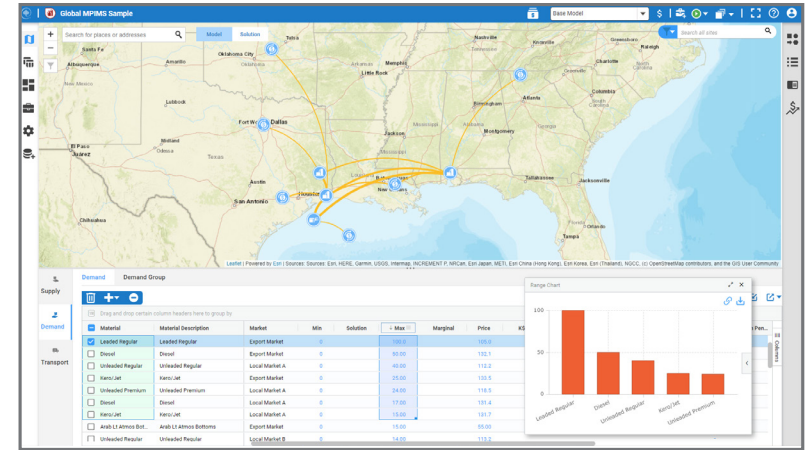


Figure 7. Aspen Unified Multisite for PIMS map and graphing.

# Production Accounting

## Technology: Aspen Unified Reconciliation and Accounting™

### Key Capabilities

- Complete tasks more easily with intuitive workflows, close the balance faster with the cutting-edge Smart Solver and easily interpret results with advanced visualization and powerful dynamic reports
- Simultaneous mass and volume balance automatically resolves lab-measured density errors to increase reconciliation accuracy while lowering sampling costs
- Automate CO<sub>2</sub> emissions data collection and aggregation from multiple sources for compliance and reporting
- Integrate plan and schedule data to highlight Plan vs Actual in AURA

### Key Benefits

- Reduce material losses and increase margins with fast, efficient mass and volume balance
- Empower key stakeholders to make better decisions based on validated and reconciled production data
- Save deployment time and effort during model implementation and maintenance with a library of standard objects and calculations, and the streamlined AORA-to-AURA migration tool

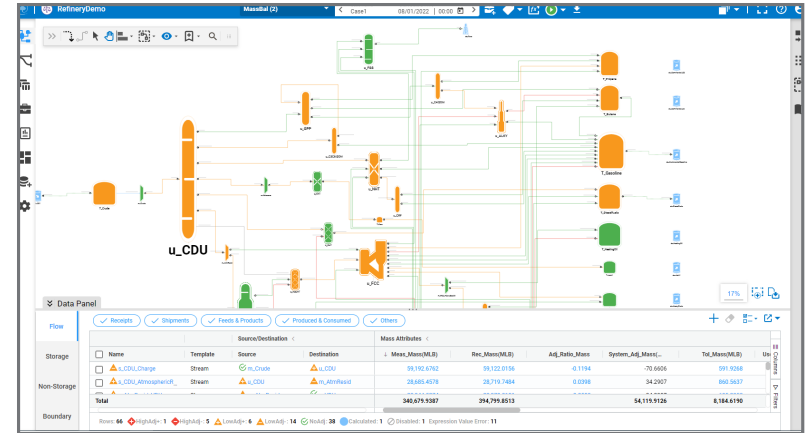


Figure 8. Flowsheet model view.

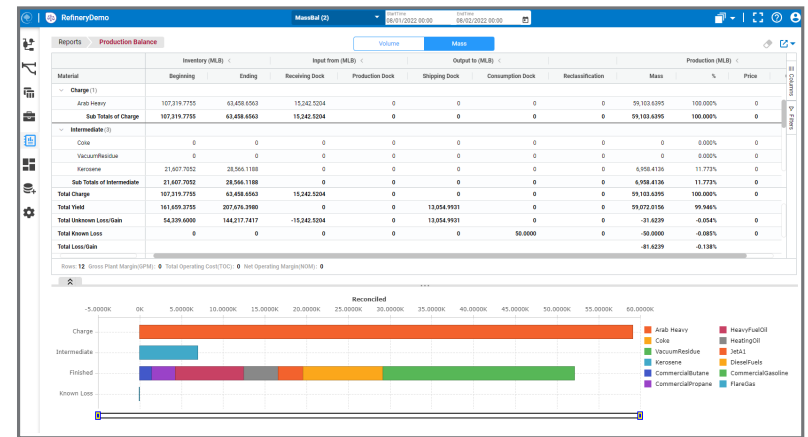


Figure 9. Dynamic reports include minimal configuration.



# Chevron Assay Database

**Technology: Aspen Assay Management™ with Partner, Equinox Software and Services Pvt. Ltd.**

## Key Capabilities

- Over 1000 unique crudes with over 2800 assays and over 60 physical and chemical properties
- All major globally traded crudes are represented by multiple assays
- Updated regularly
- Contact your AspenTech Sales representative for more information

## Key Benefits

- Increase planning model accuracy with more accurate assays
- Select better crudes for higher refining margin
- Analyze new crudes for spot opportunities
- Value crudes more accurately for trading



# Verify Plan Results with Artificial Intelligence (AI)

## Technology: Aspen Verify for Planning™

### Key Capabilities

- Analyze historical plan results with AI algorithms to create clusters of data to better understand results and thus make better business decisions
- Rank variables by impact on the profitability of the plan to focus your time investigating what impacts the plan most

### Key Benefits

- Help new planners and plan reviewers (such as operations and technical management) to understand the plan and see how it compares to history
- Identify discrepancies to prevent costly mistakes in the plan, saving approximately \$1–3M per year<sup>2</sup>
- Save time reviewing the plan—approximately 4 hours per week for a planner and 1 hour per month for each plan reviewer

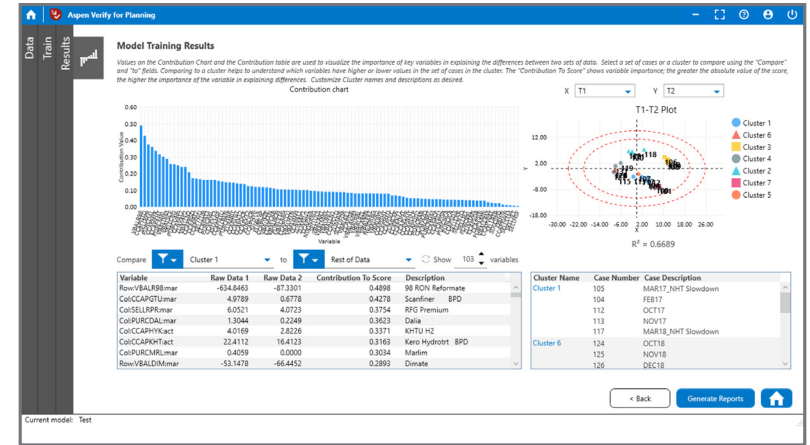


Figure 10. Aspen Verify for Planning home page.

<sup>2</sup>Contact AspenTech for a benefits estimate





## About AspenTech

Aspen Technology, Inc. (NASDAQ: AZPN) is a global software leader helping industries at the forefront of the world's dual challenge meet the increasing demand for resources from a rapidly growing population in a profitable and sustainable manner. AspenTech solutions address complex environments where it is critical to optimize the asset design, operation and maintenance lifecycle. Through our unique combination of deep domain expertise and innovation, customers in asset-intensive industries can run their assets safer, greener, longer and faster to improve their operational excellence..

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