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VISUAL MESA™

SUPPLY CHAIN SCHEDULING

TECHNICAL DATASHEET

Visual MESA™ Supply Chain Scheduling (VM-SCS) is a single, integrated, end-to-end model of the entire refinery or petrochemical complex supply chain, from raw material supply (via marine / river terminals, pipelines or rail), through tank-yard logistics (offsite battery limits), plant operations (onsite battery limits), and product logistics (via marine / river terminals, pipelines, or rail).

VM-SCS provides future visibility through detailed simulation models of both logistic and unit operations, keeping constantly updated projections of inventories and material properties. These projections are automatically updated in the event of any modification of the operations plan or plant data, allowing the constant verification of the feasibility of the operations and assessing the schedule quality via performance indicators. The simulation engine is equipped with an automatic state event detection mechanism on control variables established by the user, which enables alerts on critical situations such as out-of-range levels and properties, and material degradation by blending.

VM-SCS enables plant personnel to schedule and simulate operations on an integrated supply chain topological model. From the areas of feedstock reception, tank yards, docks, through unit operation plants, to product shipment. The model includes all relevant equipment and their connectivity. In this way, the simulation of the scheduled operations automatically propagates the effects of these operations along the supply chain, allowing the easy identification of possible imbalances between interdependent operations.

Key benefits

- Improve dock / jetty efficiency (reduce demurrage)
- Improve pipeline efficiency (tracking parcels and compositions)
- Enhance crude blending and scheduling (maximize CDU capacity per coker, hydrocracker, H2S constraints)
- Increase plant throughput (utilize actual daily unit capacities)
- Enhance unit conversion (better knowledge and scheduling of feedstream compositions)
- Improve inventory management (business rules such as auto tank sequences)
- Enhancements in refinery safety (minimize tank overflows)
- Reduce logistic costs
- Reduce product quality giveaway with multi-blend optimizer
- Enhance refinery agility (performing What-If case studies)

Return on Investment

A typical US Gulf Coast refinery with full scope application should expect a return on their investment within 2-3 months.



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Technology advantages

Hybrid discrete event and continuous non-linear simulation

- Simulator uses continuous differential equation integration
- Uses event-based simulation and not limited by using predefined time periods
- Allows the simulation of continuous changes along the timeline
- Allows the detection of state based events, for example, as components are blended into a tank, the properties are changing continuously. At some unknown time, a quality value reaches a target or spec. VM-SCS creates an event at that exact moment.
- Web-based J2EE plugin architecture accelerates the design, development and deployment of enterprise solutions
- Node based modelling of the supply chain network
- Advanced dynamic graphical environment
- Robust integration with the Plant Information Management Systems (PIMS) and Enterprise Resource Planning (ERP) systems
- Shares common code foundation with VM-PA for database management, OPC historian connector, ODBC connector, transactions and inventory connectors, MS-Excel Add-in, report designer, event, audit and user management
- Business automation rules and mathematical programming optimization routines, which are provided for a number of applications, can be extended to provide further intelligent decision support capabilities layered on top of the supply chain simulator

Entire supply chain scheduling

- Scheduling crude oil nominations
- Ship and jetty scheduling
- Pipeline operations, parcel and composition tracking
- Movements in the tank yard
- Refinery and petrochemical unit operations
- Feedstock and product blending
- Product shipments and terminal operations

From monthly plan to feasible operation

Tracking of LP (linear programming) planning targets while scheduling operations.

- Planning targets fulfillment is monitored in the same simulation environment guiding the scheduling process
- Translation of planning targets into meaningful and early indicators of deviations
- Computation of deviations as the environment or current schedule is modified
- Alert on deviations greater than a given notification threshold
- Support for tracking accumulated deviation from past to assess planning target fulfillment.

Powerful scheduler interface

- Advanced dynamic graphical environment
- Schedule ships into jetty/berth with Gantt chart
- View parcels in pipeline with process graphic
- Gasoline blending: specs and components in grid table
- Tank volumes in trend chart
- Build or modify plant with process flowsheet builder

Crude oil, gasoline and fuels blending

- Multi-product, multi-blending optimizer which considers all constraints and component inventories
- Crude oil, gasoline, diesel, fuel oil and bunker oil
- Asphalt, heating oil and naphtha feedstock
- Component tank and unit rundown blending
- Blending to pipeline or tank with heel

The objectives of the blending optimization include minimizing octane and rvp giveaway, minimizing deviation from planned recipe, reducing the use of more costly blend components, and complying with governmental and environmental requirements.

Crude and fuel oil terminal

- Schedule pipeline, ship, barge and rail parcels
- Multiple interconnected terminals in a single model
- Tank to tank transfer scheduling with sequencing rules
- Simple ratio or optimized blending to tank with heel
- Manage scheduling of complex contracts

Designed for multi-user collaboration

- The single model is segmented under different areas
- User profiles control model area read-write permissions
- A consensus schedule is published for plant use
- Schedulers open a local case for exploring alternatives
- Changes to a local case can only affect the user's area
- Local changes update the plant schedule when checked-in

Why choose VM-SCS?

VM-SCS delivers end-to-end supply chain scheduling of refinery and petrochemical complexes from scheduling receipts of raw material, jetty and pipelines, tank to tank transfers, process unit scheduling, product blending, and product terminals. All scheduling is conducted in a single model, within a single system, using web-based J2EE component architecture. VM-SCS delivers unsurpassed benefits with lower maintenance.

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Find out more: For more information or to discuss how we can improve your supply chain scheduling, please contact us now.