

Avocet Workflow Technologies

Integrated workflow management and advanced data analysis

Avocet * Workflow Technologies enable integrated Schlumberger production operations management solutions. These technologies include

- Avocet Workflow Manager (formerly called DECIDE!* Data Hub)
- Avocet Workflow Builder (formerly called DECIDE! Desktop).

Flexible workflow tools offer fast and accurate answers to complex questions and readily integrate with production applications and data repositories to deliver continuous performance improvement.

Workflow automation

Conditioning and preprocessing of production data are typically manually intensive processes with difficult-to-reuse associated workflows. A lack of process automation, standardization, and integration leads to reactive decision making, which can have a substantial cost in terms of lost production, lost time, and ultimately lost money.

Avocet Workflow Manager (AWM) is a workflow engine. The capabilities of AWM span the entire data automation workflow while serving the needs of different end-users. Reusable rule building blocks securely deliver

- proactive decision making
- automation of any defined workflow—both routine and complex
- performance of automated, standardized data management tasks to ensure repeatability and certainty
- easy maintenance and updating of workflows

AWM’s key capabilities include the transfer of data and scheduling engineering tasks to perform model optimization: automated data capture, cleansing, conditioning, and preprocessing; validation; and performance monitoring.

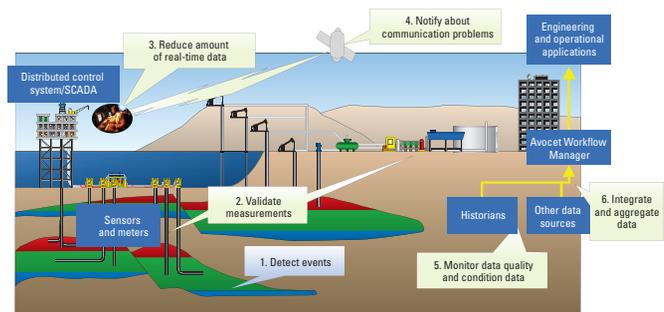
Data acquisition, data conditioning, and event notification

Engineers spend up to 70% of their time looking for, handling, and validating data. AWM makes the data acquisition and conditioning process as easy and as fast as possible. AWM:

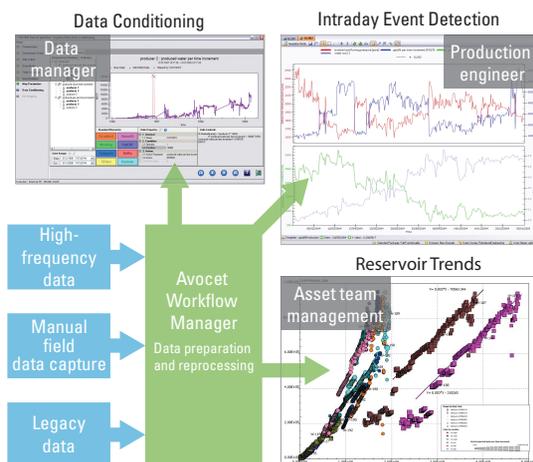
- acquires the data you need from virtually any source, including ODBC, OLEDB, PRODML, and other XML protocols—including from Oracle®, Microsoft SQL Server®, IP21®, and OsiSoft® systems.
- conditions the data and aggregates multiple time frequencies.

A set of built-in, state-of-the-art tools consolidates data into a single reliable hub using a rules-based approach. Algorithms cleanse and aggregate data to remove outliers, check sensor health, de-noise data, and aggregate to a consistent time frequency.

The workflow scheduling capabilities enact seamless data acquisition, data cleansing, and event notification alarms with no interaction required by the engineer. Flexible alarm capabilities provide alarm notifications for automated workflow results, the detection of production anomalies, and decreasing data quality.



Avocet Workflow Manager streamlines end-to-end workflow and analysis solutions.



Avocet Workflow Manager data processing workflow. Data is acquired from multiple sources, then aggregated and conditioned to provide robust information for subsequent engineering analysis.

Data mining and data-driven modeling

As the quantity of production and operations data increases, it’s more difficult to derive quality information from it. Data mining discovers hidden correlations, patterns, and trends by sifting through large volumes of data. It employs advanced pattern recognition as well as statistical and mathematical techniques that can be applied at the well, branch, or asset level for:

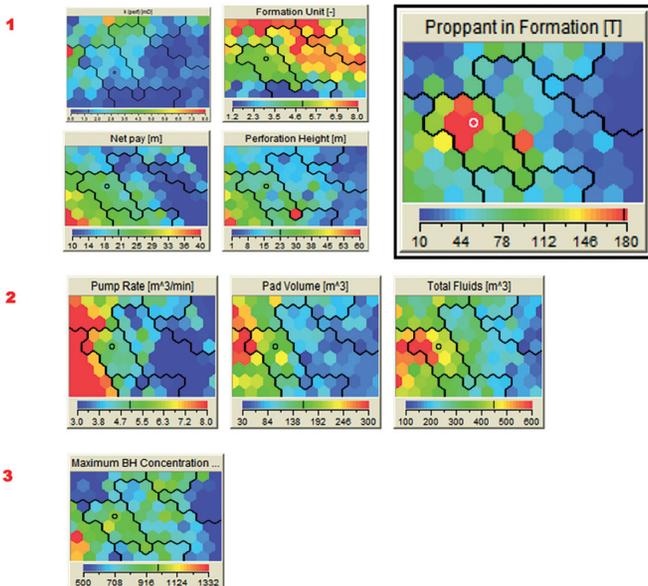
- production data quality control
- database reconciliation (to fill in missing data)
- anomalous well behavior identification and prediction
- well performance estimation
- data-driven candidate selection.

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Avocet Workflow Builder (AWB) delivers advanced data driven techniques:

- **Multidimensional crossplots** identify nonobvious correlations from different sets of data. AWB crossplots can combine 4 or more factors (such as x-axis, y-axis, bubble size, bubble color, angle) into a single view.
- **Neural networks**—computational models inspired by the organization of the human brain—can recognize noisy data or intelligently fill in missing data. These models provide great value for prediction, diagnosis, or control purposes.
- **Self-organizing maps (SOMs)** combine data clustering and visualization techniques. Applications include candidate selection, for example, identifying wells with similar behaviors or characteristics.

All of these techniques take advantage of the capabilities of Avocet Workflow Manager to deliver seamlessly integrated, automated workflows with built-in data-driven analysis.



Optimizing a fracturing operation using a self-organizing map.

Smart Views



Performance Engine

- Workflow automation and scheduling
- Data driven surveillance
- Rule based surveillance
- Model based surveillance



Data Factory



Production operation workflows offer fast, accurate answers to complex questions.

Integration with production applications and data repositories

Avocet Workflow Technology uses the Microsoft® Windows® workflow foundation to enable unmatched openness. This open technology readily integrates data and workflow sharing with external applications. No other offering combines and automates processes into a single workflow from multiple applications or data repositories, such as Avocet Volumes Manager, ECLIPSE* reservoir simulation software, PIPESIM* production system analysis software, third-party products, and virtually any industry-established data historian.

Shared information enables monitoring of asset performance (actual versus expected behavior). The effectiveness of actions taken is recorded as part of the workflow definition. Other events and the alarm management system can be updated based on the new results.

Avocet Workflow Technologies provide visual KPIs using an Avocet Surveillance visualization layer for monitoring, surveillance, and integrated model-driven and optimization workflows. This integrated solution is delivered through Schlumberger Production Optimization Centers, a foundation for integrated production operations and optimization.

Schlumberger Information Solutions

Schlumberger Information Solutions (SIS) is an operating unit of Schlumberger that provides software, information management, IT, and related services. SIS collaborates closely with oil and gas companies to solve today's tough reservoir challenges with an open business approach and comprehensive solution deployment. Through our technologies and services, oil and gas companies empower their people to improve business performance by reducing exploration and development risk and optimizing operational efficiencies.

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