



Driving Industrial-Scale Energy Analytics Through Push Compute

The era of the digital oil field

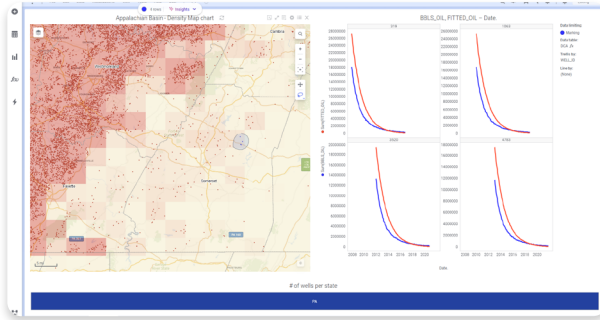
Today's energy landscape demands unprecedented operational agility, requiring companies to navigate intense market volatility while pursuing cost reductions and regulatory compliance. These require instant, high-precision decision-making and, therefore, a fundamental shift in how the modern oil and gas enterprise processes information: A unified approach that can seamlessly convert millions of rows of complex subsurface, technical, and operational data into immediate, confident, and capital-efficient actions.

Push compute: The data analytics foundation to solve complex energy problems at scale

Energy companies must synthesize insights across a fragmented landscape of technical data types—including seismic attributes, reservoir simulations, well logs (LAS), drilling/completions data, and real-time SCADA streams.

With **Spotfire® Push Compute**, joint customers can execute data-intensive, complex calculations directly within their secure data environment, eliminating performance bottlenecks and enabling cross-domain collaboration at an unprecedented scale. By combining the industrial-scale storage and scalable processing of the Snowflake AI Data Cloud with the industry-specific visual analytics of Spotfire, energy companies can unlock the full value of their data where it resides.

Together, Spotfire and Snowflake unify this ecosystem into a single, governed analytical environment:



Live Snowpark Analytics - Spotfire seamlessly extracts targeted well data from a 1.7-billion-row Snowflake dataset, executing complex curve-fitting regressions on the fly without moving the data.

- **Data stays securely in Snowflake:** Snowflake serves as the single, integrated platform for all energy data, managing security, governance, and scalable queries.
- **Insights come to life in Spotfire:** Spotfire brings that data to life through an industry-native analytical workspace, advanced AI-assisted insights, and customizable, energy-specific visualizations..
- **Secure ecosystem collaboration:** Snowflake accelerates cross-domain data sharing, enabling Spotfire to integrate external datasets and any assets exposed on the Snowflake platform directly. Spotfire fully supports Snowflake's latest authorization workflows, allowing organizations to securely provision and share analytical applications.

The power of push compute: Unlocking massive scale

Spotfire Push Compute on the Snowflake AI Data Cloud redefines the art of the possible for energy analytics. Rather than extracting

high-volume datasets from secure environments for calculations, Push Compute brings analytics directly to the data.

Key advantages

- **Eliminate data movement:** Run advanced energy data transformations, machine learning models, and heavy calculations directly in Snowflake clusters. This reduces security risks, eliminates network latency, and lowers egress costs.
- **Performance at scale:** Seamlessly scale from initial exploratory analysis to production-grade, high-volume workloads by matching the right compute power to the specific analytics challenge.
- **The best of both worlds:** Keep intensive data crunching and heavy-duty distributed processing in Snowflake while maintaining fluid, in-memory interactive visualizations in Spotfire. Engineers can manipulate massive datasets instantly without experiencing performance degradation.

High-value analytical use cases

By pairing Spotfire's industry-specific visualization capabilities with Snowflake's high-speed distributed compute, cross-functional teams can solve mission-critical use cases across the oil and gas value chain:

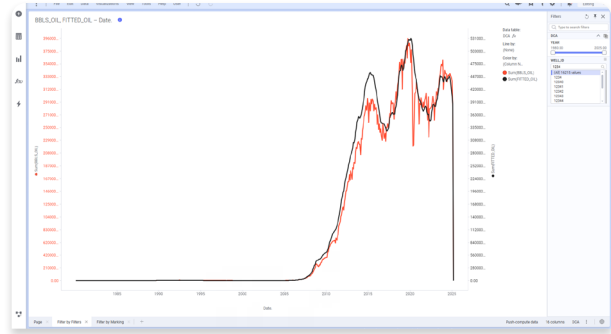
- **Asset valuation:** Assessing the value and risk of assets and investment opportunities requires energy organizations to integrate subsurface, production, and operational data, along with market assumptions, into a coherent view. With Spotfire, teams can visually and interactively explore scenarios by uniting

geological, engineering, and financial data in a single analytical environment to confidently make investment decisions.

- **Field development:** Teams must understand how well placement, reservoir behavior, completions design, and infrastructure interact over time to plan and optimize field development strategies. By combining operational, production, and subsurface data, Spotfire empowers engineers to interactively compare development scenarios and take informed decisions before capital deployment.
- **Production optimization:** Energy companies need to synthesize production data across operations to identify, optimize, and prioritize production opportunities. By leveraging Spotfire, engineers can monitor production performance, analyze time-series data, and identify operational anomalies early, thereby driving efficiency.
- **Operational excellence:** Maintaining safe and efficient operations requires a comprehensive view of sensors, equipment, and operations across the company's infrastructure. Using Spotfire, engineers can combine real-time monitoring with historical context to understand operational behavior and detect risks before they arise.

Scaling Oil & Gas Workflows with Spotfire Push Compute Capabilities

The following highlights how our Spotfire push compute capabilities are enabling and supporting these key workflows and computations:



Instant Billion-Row Scale - Push compute aggregates the entire 1.7-billion-row dataset in seconds, generating a macro-level global baseline so SMEs can instantly benchmark specific well deviations.

Decline curve analysis

- **Basin-scale DCA at speed:** Run Arps or modified Arps decline curves per well across tens of thousands of wells — Forecasts and EUR calculations computed at scale in Snowflake on a scheduled cadence, then explored interactively in Spotfire's robust energy-specific visualizations.
- **Type well selection:** Statistical distance and similarity scoring across large production datasets surfaced directly in Spotfire's map chart, enabling rapid analog identification at scale.

Petrophysics & well log analysis

- **Bulk petrophysical computation:** Petrophysical properties (Vsh, Sw, and others) computed across thousands of wells in Snowflake, then visualized in Spotfire's well log chart for rapid basin-wide review.
- **Zonal statistics & facies classification:** Clustering and zonal statistics within formation tops run across an entire well set, with results displayed in cross plots and log tracks — no manual per-well processing required.

Geospatial & surface volumetrics

- **Grid-scale volumetrics:** Net pay and volumetric calculations over large gridded surfaces executed in Snowflake, with results rendered in Spotfire's map and 3D surface views — enabling reservoir-scale analysis that would otherwise overwhelm a desktop environment.

Completions & reservoir analysis

- **Multivariate performance analysis:** Hundreds of completion, geology, and drilling parameters modeled against production, EUR, and financial outcomes in Snowflake — results surfaced in Spotfire for multivariate analysis to identify top performance drivers across a play.
- **Basin-wide recompletion & refrac screening:** Candidate scoring workflows scaled from single-area analysis to full-basin coverage by offloading compute to Snowflake, with ranked results returned to Spotfire for decision-making.

Completions & reservoir analysis

- **SCADA & sensor anomaly detection:** High-frequency operational data aggregated and screened for anomalies entirely within Snowflake, then explored using the time-series visualization capabilities of Spotfire for rapid triage.
- **Production allocation at scale:** Well-to-meter and facility-level allocation calculations run across full datasets in Snowflake, with results displayed in Spotfire Sankey diagrams and hierarchical charts for clear operational visibility.

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Spotfire is a visual industrial analytics platform that helps organizations analyze complex operational, engineering, and business data to make better decisions. By combining interactive analytics, AI-assisted investigation, advanced data science, and industry-specific workflows, Spotfire enables domain experts to uncover insights, reduce uncertainty, and improve outcomes across complex industrial operations.

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