Spotfire™
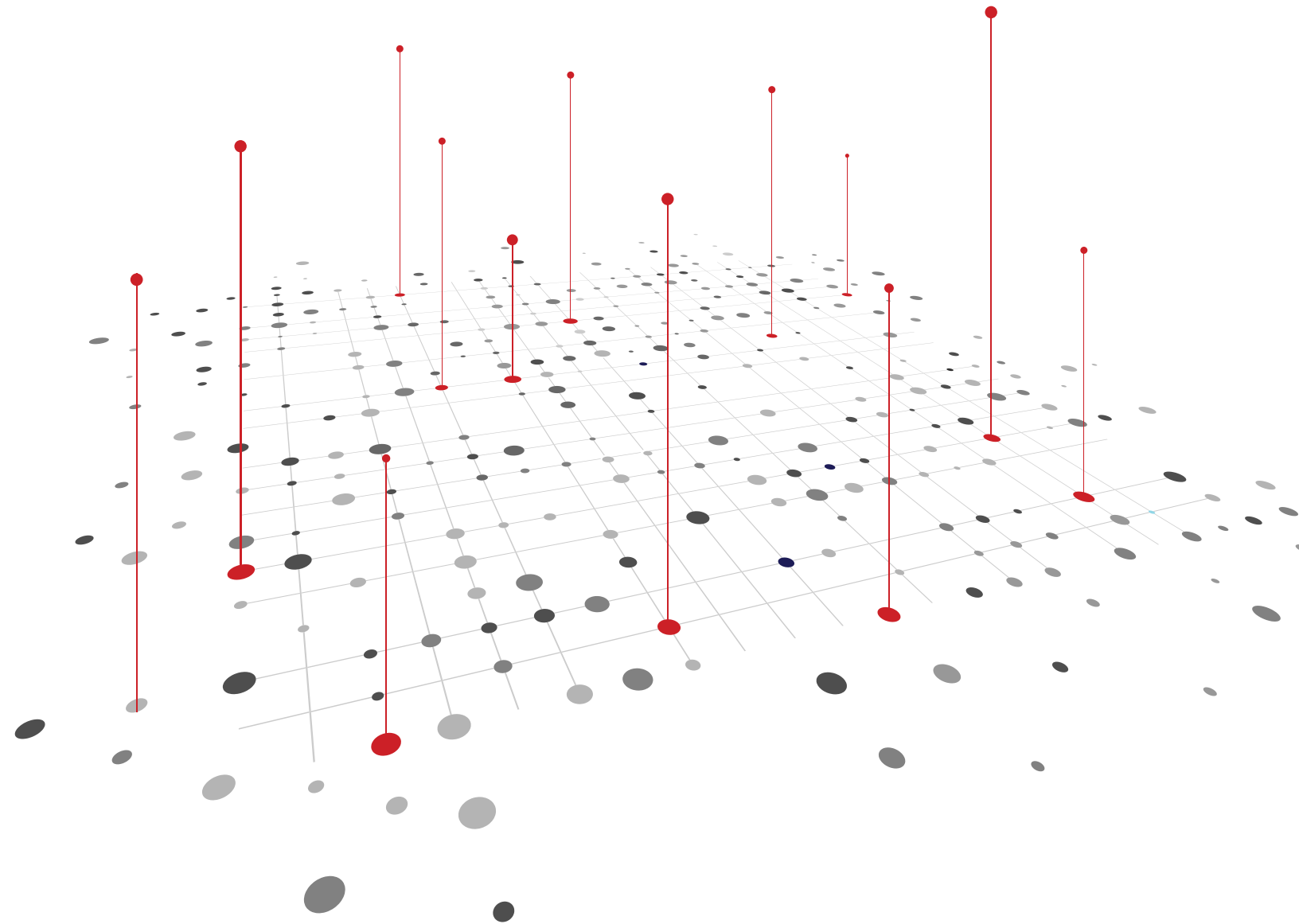
HARTENERGY

Better Data Analytics Means Better Results for the Energy Industry

Table of Contents

Executive Summary

In today's fast-paced energy sector, success relies on fast, precise, and highly technically informed decision-making. Energy companies need a powerful analytics platform that accelerates data evaluation, breaks down communication silos, and streamlines the delivery of critical insights—empowering decision-makers with actionable intelligence through advanced data science methodologies. What once seemed ambitious is now achievable with Spotfire. The Spotfire Visual Data Science platform is revolutionizing the industry by enabling greater operational agility, reducing risks, enhancing safety, and driving better project economics—from exploration to production.

The Data Challenge

Access to accurate data and reliable communication is critical across the life cycle of an energy project, from reservoir characterization, through field development and production. But the incessant high-volume flow of heterogeneous data can be overwhelming, and sifting through the data stream to find the useful bits can be time-consuming and complicated.

Without the right analytics tools, engineers and scientists find it difficult to convert data into decisions.

Today, improvements in data analytics are changing the playing field in the energy industry by redefining what is possible.

Visual data science integrates the capabilities of data science and business intelligence disciplines in a single platform. Unlike traditional business intelligence platforms that cater to everyday business users, a visual data science platform is designed for domain experts.

This is a critical distinction.

Subject matter experts have direct knowledge of the site conditions and unique project challenges. With enabling technology that allows them to solve problems using their experience, expertise, and insights, they have the necessary tools to simplify analytics and enable faster and more creative problem-solving. And that is a competitive edge.

The Spotfire® visual data science platform transforms data analytics into visual insights to help energy experts de-risk decision-making, increase operational agility, and improve economics.

Implementing a Novel Solution

The Spotfire platform combines best-in-class visual data exploration and advanced oilfield analytics to drive insights and actions. Powered by AI, this platform puts more information in the hands of engineers and scientists working on reservoir and geoscientific analysis, drilling, and completions processes, and production activities, allowing them to rapidly decipher and process data to improve operations.

The Spotfire visual data science platform delivers on every level to streamline and optimize operations from exploration through production.

This tool performs the data wrangling that can bog down people and processes, matching and merging data of all types from high-dimensional seismic attributes, to well logs and drilling plans, to multivariate process data from historians. The power of the platform enables a unified view of disparate data, making it possible to stack and split, transform, aggregate, augment, calculate, and link data to mirror complex oilfield relationships.

Human + AI-powered exploration changes how scientists and engineers interact with data, empowering drag-and-drop visualization of 2D, 3D, and 4D data from any angle. Experts can ask iterative questions as well as mark and annotate interesting ranges, outliers, and groupings. Clicking on any parameter, group, or marker signals the Spotfire® AI-powered Recommendations Engine to suggest insightful views, highlight important relationships, and automatically visualize them. These high-quality visualizations can be used as is, or users can download and create custom visuals with the extensible "Mods" JavaScript framework.

The platform also produces maps without the complexity of classic geoanalytics tools and can layer geodata, shape files, images, and tabular data—empowering cross-layer calculations.

Spotfire provides access to hundreds of analytical methods, including dynamic time and depth warping, interactive curve fits, autoencoders, forecast methods, econometrics, spatial statistics, and neural networks. It allows users to build data functions using a workflow-style machine learning workbench or plug in the latest Python or R libraries from an SPE or Computational Geosciences paper.

Built-in tools allow teams to share information via visual data science apps on a desktop, the web, or mobile device, deliver visuals and computations with annotations to explain the steps, guide analytic choices, and interpret results.

Spotfire offers easy, scripted deployments to modern cloud and container Infrastructure as a Service (IaaS) platforms. Securely authenticate team members with SSO, and share resources in the Spotfire library, govern who has access to which assets, and version control critical workflows to ensure proper

methodologies are followed. Audit usage by data source, employee, or analytical asset for enterprise-level control.

This extensive combination of capabilities transforms the work environment.

Visual Data Science in Action

Data democratization is foundational to visual data science. By breaking down barriers that prevent people from accessing and using data effectively, democratization opens the door to creativity. Spotfire provides multiple ways to interface with the data to create value.

With a broad suite of flexible tools, reservoir engineers and geoscientists can value assets and leases, create reservoir simulations, analyze field development scenarios, and optimize development strategies as well as forecast production and estimated ultimate recovery.

For drilling and completion engineers, Spotfire makes it easy to generate field development plans that maximize return on capital equipment and create and visualize drilling plans that are easy to explain and execute. During drilling programs, engineers can use the platform to optimize downhole operations and make continuous improvements by learning from what works.

In the production phase, engineers integrate diverse data types to identify unusual behaviors by geography, service provider, interval, completion approach, or other critical characteristics. They can quickly pinpoint underperforming wells, determine root causes, and implement strategies to mitigate impacts on production.

Extending the Reach of Advanced Analytics

Spotfire visualizations can be extended through a well-defined framework of Spotfire® Mods, custom visualization and analytics apps that deliver a seamless, customizable analytics experience. Unique to Spotfire, Mods enable users, regardless of technical expertise, to build, share, and use powerful analytics tools.

Representative industry-specific tools include:

Ternary Plot Mod is used for gas and crude oil analysis. Ternary plots are an effortless way to visualize and analyze a stream that includes mixtures of three components.

Well Log Mod simplifies visualization and analysis of wireline data, well log data, and geophysical data collected while drilling, including subsurface geology and rock properties.

List Mod presents asset frameworks in data historian systems. It can display a selectable list of unique values in a column or hierarchy for effective data management, analysis, and visualization.

Timeline Mod makes it easy to understand hydraulic fracturing in both depth and time domains, displaying a list of events in chronological order to visually display time-related information.

Spotfire Copilot™, a natural language extension to the Spotfire platform, leverages large language models (LLMs) to augment business intelligence and artificial intelligence. Although it is not native to the platform, it can be downloaded to enhance Spotfire by executing a range of language tasks, including question-answering, code generation, text summarization, and multimodal advances in a private and secure manner.

With the Spotfire Copilot AI tool, it is possible to ask simple questions and get useful results. From, "How do I export this page as a pdf?" to "What should I be looking at in my data?" to more complex requests, like, "Create an interesting visualization."

The ability to perform general question-answering gives inexperienced users the ability to get up to speed with the platform quickly and advanced analytics allow seasoned scientists and engineers to quickly generate charts, data views, and reports. Spotfire Copilot is cloud agnostic and can be configured to use any LLM.

Spotfire Copilot Features
- Question-answering for Spotfire questions
- Question-answering for user-loaded documents
- Auto visualization generation and modification
- Data function generation
- Explanation of visualizations
- Data interrogation
- Copilot and generative AI

Capitalizing on Enabling Technology

Spotfire visual data science is an enabler that turns data into actionable insights. As the only true visual data science platform, it gives users the power to solve complex problems by combining visualizations and advanced analytics, allowing experts to find industry-specific solutions that the human mind or computers cannot solve alone.

Contact us to **speak with an expert** and learn more.