kinetica

GPU-ACCELERATED DATABASE FOR OIL AND GAS

From exploration and production, to distribution and consumption—new opportunities are arising for oil and gas companies to leverage data and real-time analytics to modernize the business and meet the voracious global energy demand. Kinetica, a GPU-accelerated analytics database, makes it possible for oil and gas companies to derive faster insights from vast volumes of streaming data and find efficiencies, remove waste, reduce costs, and improve safety.

STREAMING ANALYTICS DATABASE WITH NATIVE GEOSPATIAL PIPELINE

Kinetica is the fastest GPU-accelerated, in-memory analytics database that delivers truly real-time response to queries on large, complex, and streaming data: 100x faster performance at 1/10 of the hardware of traditional databases. Kinetica's geospatial features such as native datatypes, functions, and visualizations make it possible to quickly analyze massive data sets, discover patterns, and uncover hidden insights to optimize the upstream, midstream, and downstream oil and gas processes. Kinetica's enterprise-grade, easy to use, secure, highly-available database runs in data centers or public cloud, and scales out linearly to manage oil and gas data.

Lightning-fast Query is Ideal for Real-time Applications

Time-sensitive upstream and downstream oil and gas applications such as those for production management, revenue management, distribution, operations, and asset management require real-time analytics on continuously-moving data from sources such as wells, machines, energy grids, and smart meters to discover trends and anomalies and take immediate actions. Kinetica takes advantage of GPU's massive parallelization, distributed computing, and in-memory processing to simultaneously ingest, analyze, visualize, and act on fast-moving data to uncover patterns and anomalies, and deliver actionable insights in milliseconds for real-time actions. APIs and out-of-the-box connectors for other databases, business applications, cloud, mobile apps, and streaming solutions such as Apache Kafka, Apache NiFi, Apache Storm, and Apache Spark enable parallel ingest, analytics, and egress of continuous data streams for low-latency actions and faster time to value.

Converge AI and BI to do More with Data

Continuously flowing data far surpasses the ability of humans, manual processes, and legacy systems to store, manage, and act on it in a timely and cost-effective manner. Oil and gas companies need modern, cognitive techniques such as artificial intelligence (AI), machine learning (ML), and deep learning to intelligently, automatically, scalably, and cost-effectively manage, analyze, and act on data. Kinetica's open architecture features in-database analytics with User-Defined Functions (UDFs) to extend database functionality with AI, ML, deep learning, and natural language processing. Developers and data scientists can deploy custom code and advanced machine learning libraries such as TensorFlow, Torch, and Caffe natively in the database as GPU-accelerated business logic to power advanced analytics. These advanced algorithms can then be automated or made available to non-technical analysts through SQL and commonly available click-based, self-service BI and visualization tools in a closed-loop fashion to uncover patterns, anomalies, and take actions.
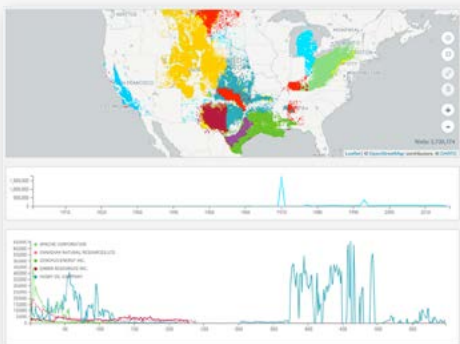
Key capabilities

- **Low Latency, Lightning-fast Database.** Ingest, explore, analyze, visualize, and act on large, streaming datasets in milliseconds

- **Real-time Operational Analytics,** machine learning, deep learning for automated insights from large, complex, continuously-moving data from sensors, connected devices and IoT systems

- **Scale, Security, and Flexibility** to meet strict SLAs

Large oil and gas producer uses Kinetica for real-time drilling and well analytics

A large oil and gas producer is using Kinetica to improve the yield of production processes through granular geospatial analytics and visualization of geological, well level, drilling, and production data. The company replaced their legacy analytics system with Kinetica to ingest, join, and visualize data in real time at scale—for real-time drilling analytics with visualizations and charting. Kinetica acts as the speed layer on top of the Hadoop data lake for geospatial visualization and analytics of massive numbers of wells, pipelines by land ownership, region, etc.

Why Kinetica?

- **Better performance:** 100X faster performance on 1/10th the hardware

- **In-database analytics:** Machine Learning, Deep Learning, NLP, OLAP, and custom analytics

- **Native support** for geospatial and time-series data and analytics

- **APIs and connectors** for integration, interoperability, and extensibility

- **Enterprise-grade:** Familiar, standards-based relational database with security, high-availability, minimized administration

Large natural gas and electric utility provider uses Kinetica for real-time smart grid infrastructure management

A large utility company with over 10 million customers needed to figure out how to build agile systems that allowed them to quickly visualize geospatial elements, as well as have faster SLAs for geospatial analytics to manage the health of millions of assets like gas lines, power lines, and power poles. The utility turned to Kinetica to consolidate feeds and layer multiple datasets on the same visualization, fusing analytics. This ability allows the utility to optimize energy generation, distribution and uptime, despite fluctuating usage patterns and unpredictable natural disasters. Kinetica operates as a speed layer for geospatial data to monitor, manage, and predict the infrastructure health. Kinetica is also used to interactively view the health of millions of poles and gas lines located within hazardous environments (fire, snow, and corrosion), identify failed assets, spatially locate the closest asset in the same asset class, and perform real-time calculations of pole statistics based on real-time map updates.
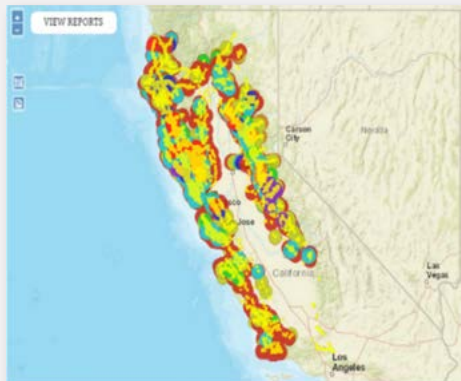
Geospatial Data and Analytics

Kinetica natively manages time-series and geospatial data such as points, shapes, tracks, and labels and provides out-of-the-box geospatial functions such as filters (by area, by series, by geometry), aggregation (histograms), and geofencing triggers. A rich visualization framework further enables interactive real-time data exploration. The GPU-accelerated rendering of maps and accompanying dashboards to facilitates location-based and analytics.

Streamline and Simplify

Kinetica's use of brute-force compute power of GPUs means less need for tuning, less indexing of data, and even reduced administration. Faster processing leads to simplicity, savings, and ease of use—as well as blazing-fast response. A scale-out architecture and support for cloud, on-premises, and hybrid deployments ensure that Kinetica offers complete flexibility for deploying and managing oil and gas data and analytics applications.

SOLUTIONS FOR OIL AND GAS

Kinetica's modern database brings together data—in motion and rest; analytics—machine learning, deep learning, fast OLAP, and geospatial analytics; and compute—GPUs, in-memory, distributed processing for an easy, fast, and elastic data and analytics system. Kinetica can be used for the following oil and gas applications:

Oil and Gas Exploration and Production (Upstream)

Oil and gas companies need to leverage real-time pipeline, well, and spatial data to determine the most viable oil fields for exploration, to remotely monitor drilling and production performance, and to prevent safety and environmental issues. By using Kinetica's data processing and visualizations, companies can perform a faster and richer analysis of seismic, drilling, and production data to improve geologic analysis, reduce exploration risk, increase drill and production performance, and improve safety and demand forecasting.

Energy Service Providers (Midstream)

Kinetica's native data processing and geospatial features make it possible to provide midstream companies, such as those that build the vast networks of oil pipelines and energy traders, with the ability to analyze comprehensive data sets for pipeline oil pressure monitoring, supply/demand forecasting, and real-time visualization of pipeline and trading operations.

Smart Meter Analytics (Downstream)

Discovering new value from high volumes of streaming IoT data is one of the biggest opportunities in energy today. Energy companies can utilize smart meters to measure how energy resources such as electricity, water, and natural gas are being used. Kinetica's ability to process streaming data and multi-billion row datasets in real time makes it a perfect solution for analyzing smart meter data to optimize energy generation and uptime, predict and prevent power outages, chart energy trends, understand customer energy usage, and improve load forecasts.

Equipment, Fleet, and Workforce Management

The analysis of streaming data plays a key role in monitoring and maintaining equipment in the energy industry. Oil and gas companies can analyze sensor data from equipment and wells to avoid the downtime, costs, and safety issues that stem from equipment failures. Utilities can analyze electrical transmission, electrical distribution, gas distribution, gas transmission, and power pole data to predict, analyze, and minimize failures. In addition, "breadcrumb data" from maintenance personnel devices and service vehicles can be tracked to find the closest crew to a trouble call, identify the most efficient route, predict vehicle maintenance issues, and reduce emissions.

To learn more about Kinetica, visit us at kinetica.com