



TIBCO Data Virtualization for the Energy Industry

USE CASES DESCRIBED:

- Offshore platform data analytics
- Well maintenance and repair
- Cross refinery web data services
- SAP master data quality

TODAY'S COMPLEX ENERGY IT LANDSCAPE

Within the energy industry, Exploration, Production, Refining, and Marketing each present unique business challenges. Integrating these disparate operations into a cohesive, multi-billion dollar global enterprise is critical to long-term success.

Similarly, integrating and analyzing the data created and used upstream, downstream, and beyond poses unique IT challenges. With siloed data assets forming an often-untapped reservoir of business opportunity and insight, energy companies who successfully leverage them can gain a significant competitive advantage.

Data virtualization can help energy companies turn their data into analytic insights. All their data, no matter where it resides — upstream, downstream, anywhere across the globe.

In this paper you will learn how energy companies use TIBCO® Data Virtualization to overcome their data and analytic challenges and gain tangible business benefits.

TOP ENERGY INDUSTRY REQUIREMENTS

Optimized upstream assets, maximized yields, on-time delivery of products through downstream distribution channels, compliance with extensive regulations, and more are critical energy business outcomes. Data and analytics are key to success.

Energy companies have made huge IT investments to enable these business outcomes. Unfortunately, these efforts have often resulted in numerous data silos and significant complexity.

TIBCO Data Virtualization is a proven approach used by four of the top five integrated energy companies to deliver more analytic data sooner from across upstream and downstream operations.

Further, rising analytic data demand and accelerating IoT-driven data supply make it even harder to drive return on these highly-diverse and widely-distributed data assets.

Traditional data warehousing and ETL alone cannot keep pace. New approaches are needed. Some of the requirements that energy companies must consider:

- *Analytics Demand Rising* – Energy companies use analytics everywhere and will continue to add significantly more analytics capabilities in the future. Maximizing production and refinery yields or meeting new regulatory mandates are but a few examples. Energy companies not only need data accessibility solutions that can provide analytic datasets to a wide variety of analytic tools, they need to access data faster and with less effort.
- *Breadth of Data Sources* – Energy information can be generated by many sources: surface and subsurface exploration and operations, refineries, labs, back offices across the globe, and business partners. The information can typically be housed in structured data sources like relational databases, data warehouses, file systems, and semi-structured data such as XML documents. Access to data sources must be done using protocols and APIs supported by these diverse sources.
- *Data Abstraction* – Energy companies also face a continuous mismatch between how their data is stored (formats, structures, APIs, etc.) and how their data is used in analytics, reports, portals, and other consuming applications. For this reason, companies now rely on industry standards such as MIMOSA and PIDX as a common way to share data. As such, data abstraction is a critical requirement.
- *High Performance, At Scale* – Today, exponentially growing data volumes are overwhelming the energy industry. For example, on a single large off-shore platform, a real-time process control application such as OSIsoft can generate nearly one million readings per hour. Energy companies need data access solutions that can process these workloads with high performance, at scale.

Data virtualization solutions such as TIBCO Data Virtualization are purpose-built to meet these enterprise-grade data access needs. Recommended by Gartner and Forrester as a must-have addition to data integration tool sets, numerous energy companies now use TIBCO Data Virtualization to help build and manage the virtualized datasets and IT-curated data services their analytics requires. With far more analytics data provided faster, and for far less, these firms have gained significant business benefits.

ENERGY USE CASES

USE CASE 1 - OFFSHORE PLATFORM DATA ANALYTICS

With as many as 40,000 sensors capturing pressure, vibration, temperature, and hundreds of other metrics, energy companies are often swimming in offshore platform data. To leverage this critical data across a range of production, safety, financial, and compliance analysis needs, businesses need high performance solutions that deliver all the data to both technical and business users quickly and easily.

TIBCO helped one of the Gulf of Mexico's largest offshore producers develop and deploy data virtualization across their offshore platform data, thereby enabling significant production and cost reductions.

Situation and Requirements:

The company has numerous offshore oil rigs throughout the Gulf of Mexico and continuously captures as many as 25 sensor readings per second. From the wells, millions of rows of data were passed to an onshore Netezza data warehouse daily using Informatica ETL, creating billions of rows in the warehouse. Outside the warehouse, the SAP plant maintenance system also served as a key source of data. All this data was highly valuable to engineers, maintenance managers, and business analysts because each user type required different slices of the data optimally formatted for their specialized analysis tools including Business Objects, Excel, TIBCO Spotfire®, Matrikon ProcessNet, Microsoft Reporting, and others.

TIBCO Data Virtualization Solution:

Using TIBCO Data Virtualization, the company built a shared virtualization layer that simplifies access to the Netezza offshore platform data warehouse, making this data available for a wide range of analytic tools. Beyond warehouse, this layer also federates additional data such as SAP plant maintenance data. (See Figure 1)

The ability for TIBCO Data Virtualization to quickly build new analytic data services enabled rapid response to new ad hoc queries. This rapid time to data, combined with ease of abstraction (convert from warehouse-stored format to tool-required format) encouraged analysts to stay with the warehouse as the single source of truth rather than replicate data in local, rogue data marts.

Further, the TIBCO Data Virtualization high-performance query engine enabled analysts to query large datasets, as many as 2 million rows in a single query. Prior to TIBCO Data Virtualization, analysts were often forced to constrain their queries and thus make decisions on subsets of the data.

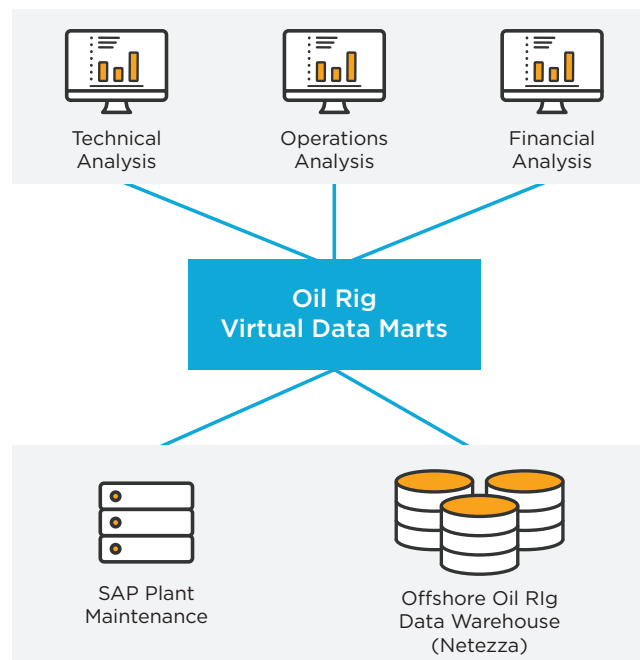


Figure 1. TIBCO Enables Off-shore Oil Rig Data Analysis

Results Achieved:

With TIBCO Data Virtualization, the company was able to gain a number of benefits including:

- Reduced offshore downtime by 1%, yielding significant revenue increases
- Accelerated development of new analytic applications and new types of analysis, improving decision effectiveness and reducing development costs
- Reduced rogue data mart growth rates and costs
- Improved productivity of analysts in both the technical and business communities

USE CASE 2 - WELL MAINTENANCE AND REPAIR

In the energy industry, keeping wells up and pumping drives revenue. When wells go down, getting the right repair rigs and teams on site fast is critical. To deploy these scarce resources optimally, dispatchers and triage teams require real-time access to a range of surface, subsurface, and business data. This data holds information that can inform repair rig status, staffing availability, best-practice procedures, maintenance records, flow rates, and more.

TIBCO Data Virtualization helped an oil and gas producer in the US to access, federate, and deliver this diverse data in real time to keep their oil and gas flowing.

Situation and Requirements:

The company has multiple wells automatically generating activity data. This data was captured in several systems including a custom SQL Server for well management, SAP for plant maintenance data, and an Oracle data warehouse for historical data. This data was consolidated nightly from all locations and delivered to the engineers the next day so they could act on it.

However, the company struggled to provide the engineers with the real-time data they needed intra-day to execute their well maintenance and repair activities. Timely, accurate data was required when a well went down so dispatchers, engineers, and repair teams could optimally deploy repair rigs and minimize production and revenue losses.

TIBCO Data Virtualization Solution:

The company developed a well data virtualization layer using TIBCO Data Virtualization to federate and deliver actionable information required to automate key maintenance and repair decisions throughout the day and relieve key resources for other value-adding tasks. (See Figure 2)

Prior to using TIBCO Data Virtualization, whenever a well went down, an ad hoc team from engineering, maintenance, and operations would jump on a conference call to contribute information about the problem, the course of action, repair equipment required, current repair equipment status, etc. They could not rely on data from the night before because repair rigs, maintenance crews, and production rates change throughout the day. Therefore, decision-making was often delayed while fresher data was gathered.

With TIBCO Data Virtualization, as soon as a well goes down, a dispatcher can see an up-to-the-minute snapshot of all the relevant data required. Fully informed, the dispatcher can quickly decide exactly what needs to be done without requiring a large number of highly paid staff to drop their current activities to jump on the “what should we do” conference call.

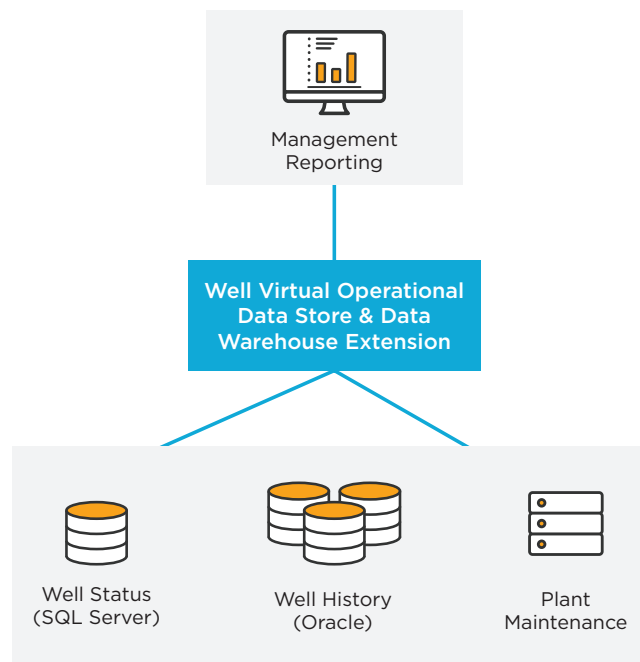


Figure 2. TIBCO Enables Up-to-the-Minute Well Maintenance and Repair

Results Achieved:

With TIBCO Data Virtualization, the company was able to gain a number of benefits including:

- 10% improvement in repair rig up time (from 89% to 98%)
- In just a few months, 100% ROI on the TIBCO Data Virtualization investment
- 20% improvement in individual field engineer efficiency by offloading logistical work from engineers to dispatchers

USE CASE 3 - CROSS-REFINERY WEB DATA SERVICES

Today's oil refineries can process several hundred thousand barrels of crude oil per day. This puts a premium on process optimization and advanced process control, both of which require highly skilled staff to intelligently analyze massive volumes of diverse refinery data. And if you have multiple refineries, delivering this data to analytics applications is exponentially more challenging.

TIBCO helped one of the world's largest refiners develop and deploy industry standard (MIMOSA) web data services that access, abstract, and deliver diverse data from over a dozen refineries across the globe, helping them achieve significant production and compliance benefits.

Situation and Requirements:

The company wanted to share process control and other data from over a dozen large refineries around the world. Chemical engineers, process engineers, maintenance managers, and business analysts used this up-to-the-minute data with their own specialized analysis tools.

Due to the numerous diverse sources and uses, the company decided to adopt the MIMOSA standard for Operations and Maintenance (O&M) and Collaborative Asset Lifecycle Management (CALM) as a common approach to share data across its refineries.

TIBCO Data Virtualization Solution:

Using the TIBCO Data Virtualization Platform and MIMOSA data models, the company developed hundreds of re-usable web data services. These data services access and abstract disparate refinery source data into MIMOSA standard data objects that can be consumed by a wide range of analytic tools. For example, there is a shared data service that provides temperature history for a set of sensors when that service is called. The consumer would only need to know the service name and refinery ID. (See Figure 3)

Combining all these services in a common TIBCO Data Virtualization environment provides analytic users with a global one stop shop common source for data, regardless of actual refinery source or format. This virtual centralized data store has enabled analysts to perform faster and broader analyses instrumental in improving refinery operations.

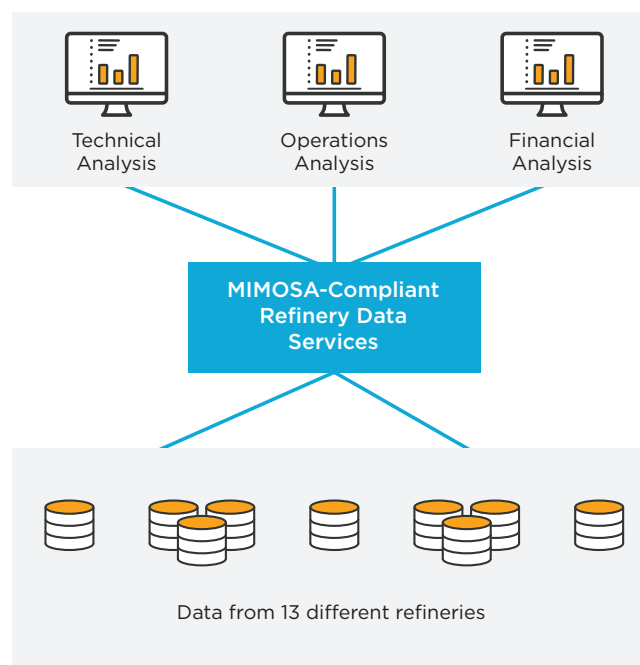


Figure 3. TIBCO Enables MIMOSA Standards-based Data Service Layer

Results Achieved:

With TIBCO Data Virtualization, the company was able to gain a number of benefits including:

- Improved revenue from refineries via better process control and mix
- Reduced downtime and EPA risks due to better preventative maintenance
- Accelerated development of new analytic applications and new types of analysis, improving decision effectiveness and reducing development costs
- Significantly reduced data access development and support costs

USE CASE 4 - SAP MASTER DATA QUALITY

SAP for Oil and Gas, along with SAP Financials, HR, and CRM are often the ERP system of choice in the energy industry. These applications are typically deployed in multiple instances across upstream, downstream, and back office operations in multiple geographic theaters. Managing SAP master data is often a significant challenge.

TIBCO helped one of the top five integrated energy companies use data virtualization to get control of its SAP master data across nearly three dozen production SAP instances, which significantly improved master data quality and reduced operating costs.

Situation and Requirements:

The company needed to gain control over the master data in their 33 production instances of SAP, as well as in over 100 additional developments, test, and staging instances. As a first step on this journey, they went after master reference data such as cost centers, account codes, market segments, etc. Having decided on DataFlux as their data cleansing solution, they needed a global approach for getting the data from SAP to DataFlux.

TIBCO Data Virtualization Solution:

Using TIBCO Data Virtualization, the company built a global SAP master data solution that simplifies and accelerates access to SAP data for data quality analysis and remediation by DataFlux. The TIBCO Data Virtualization solution replaced an error-prone and highly technical flat file extraction process that would not scale in this complex SAP landscape. (See Figure 4)

To drive adoption by distributed SAP support teams, corporate IT implemented TIBCO Data Virtualization as a centralized services offering, enabling each support team to easily leverage this standard approach.

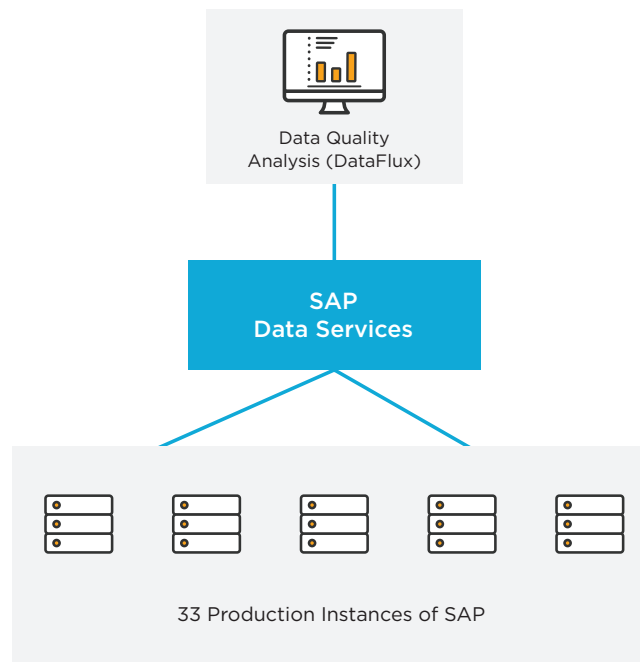


Figure 4: TIBCO Improves SAP Master Data Quality

Results Achieved:

With TIBCO Data Virtualization, the company was able to gain a number of benefits including:

- Improved the quality of data in SAP revenue-enabling and risk-reducing applications
- Reduced time and cost spent resolving data quality issues
- Paved the way for additional master data quality improvement gains within both R/3 and SAP BW

CONCLUSION

TIBCO Data Virtualization is a proven approach used by four of the top five integrated energy companies to deliver more analytic data sooner from across upstream and downstream operations. Specific use cases described include:

- Offshore Platform Data Analytics
- Well Maintenance and Repair
- Cross Refinery Web Data Services
- SAP Master Data Quality

If you are an energy company facing similar data and analytic challenges, consider [TIBCO Data Virtualization](#).



Global Headquarters
3307 Hillview Avenue
Palo Alto, CA 94304
+1 650-846-1000 TEL
+1 800-420-8450
+1 650-846-1005 FAX
www.tibco.com

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