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SOLUTION
Data Virtualization for the Oil and Gas Industry

Data Virtualization for Oil and Gas Companies

Oil and Gas Companies are Leveraging Data Virtualization to Gain Unprecedented Efficiencies

Recent years have been particularly challenging for oil and gas companies. Priced at just over $50 per barrel in 2016, brent crude oil had been priced at $115 just five years ago, and this harsh reality has affected the operational strategies of oil and gas companies around the globe. To remain competitive, oil and gas companies must, at a minimum, find ways to reduce expenses, and this is true whether they are upstream, midstream, or downstream in the oil and gas supply chain, or if they provide information or services in support of the supply chain as a whole.

Savvy oil and gas companies are actively seeking areas of inefficiency that they can invigorate. In that regard, many are taking a critical look at data assets, analyzing what percentage of their company's data is being used to improve such critical factors as pricing, production, and trading. An Oracle survey found that oil and gas companies lose an average of 22% of their annual revenue because they are not able to fully leverage the information they collect.

Often, data cannot be leveraged because it is poorly integrated. Despite the most modern advances such as cloud and big data technologies, data often ends up in functional silos: Cloud data is separated from on-premises data, transactional data is separated from analytical data, modern data is separated from legacy data, and the list goes on and on. Bringing the data together takes both time and money, as this normally requires the data to be moved to a new, central location, where it needs to be housed and maintained. Alternatively, it requires that data needs to be integrated on a continuous, ad hoc basis, which is prohibitively costly.

Data virtualization is a unique data integration technology in that it integrates data without moving it. In this brief, we explain how data virtualization works and how it enables four key use cases for the oil and gas industry. We end with four case studies of oil and gas companies that have successfully leveraged data virtualization to overcome their data integration challenges, enabling them to gain significant efficiencies that boost the bottom line.

How Does Data Virtualization Work?

Rather than *moving* the data from different sources and combining the data in a new, consolidated location, data virtualization provides a view of the combined data, leaving the source data exactly where it is across the myriad source systems. This means that oil and gas companies do not have to pay the costs of physically moving and housing the data, and yet they still gain all of the benefits of bringing the data together, including real-time access for all users, not just tech users, across the entire company.

Because data virtualization accommodates existing infrastructure in its existing state, it is relatively easy to implement, compared with other solutions. And because it provides a view of the data in real time, from a variety of systems that are normally very time consuming to integrate, such as transactional processing systems and cloud-based storage systems, it can support a wide variety of uses.

For example, data virtualization enables a "smarter" extraction and production system, one that continuously captures and applies data generated across the petroleum value chain to identify new, previously inaccessible reserves; improve asset availability; and proactively mitigate risk.

Data Virtualization Benefits

Real-time data access without replication

Consolidated views across myriad sources

A single point for implementing security and governance protocols

Detailed traces of data lineage

The ability to connect with most legacy and modern sources

Data Virtualization Use Cases for the Oil and Gas Industry

A Unified Global Well Information Repository

A major oil field services company leveraged data virtualization to create a virtualized repository of canonical well data views across dozens of sources to provide real-time, on-demand access to integrated well data without having to physically move any data.

Product Agility and Customer Satisfaction

A leading energy information services company used data virtualization to create a unified logical data layer across all information assets in the company (well, lease, production, reservoir, regulatory, etc.), across multiple geographies. Normalized data services were used as sources for applications.

Improved Data Quality and Operational Reporting

A North American pipeline and energy logistics provider leveraged data virtualization to deliver self-service intelligence on pipeline volumetrics, environmental health, and safety, using reusable data views for internal operations, customers, and regulators while reducing data replication by 80%.

Agile Business Intelligence and Big Data

A national oil company used data virtualization to create a logical data warehouse combining relational and unstructured big data with multiple interfaces for reporting tools, analytics, and data services access.

Case Studies

This section presents the case studies of four oil and gas companies, illustrating the power of data virtualization in action.

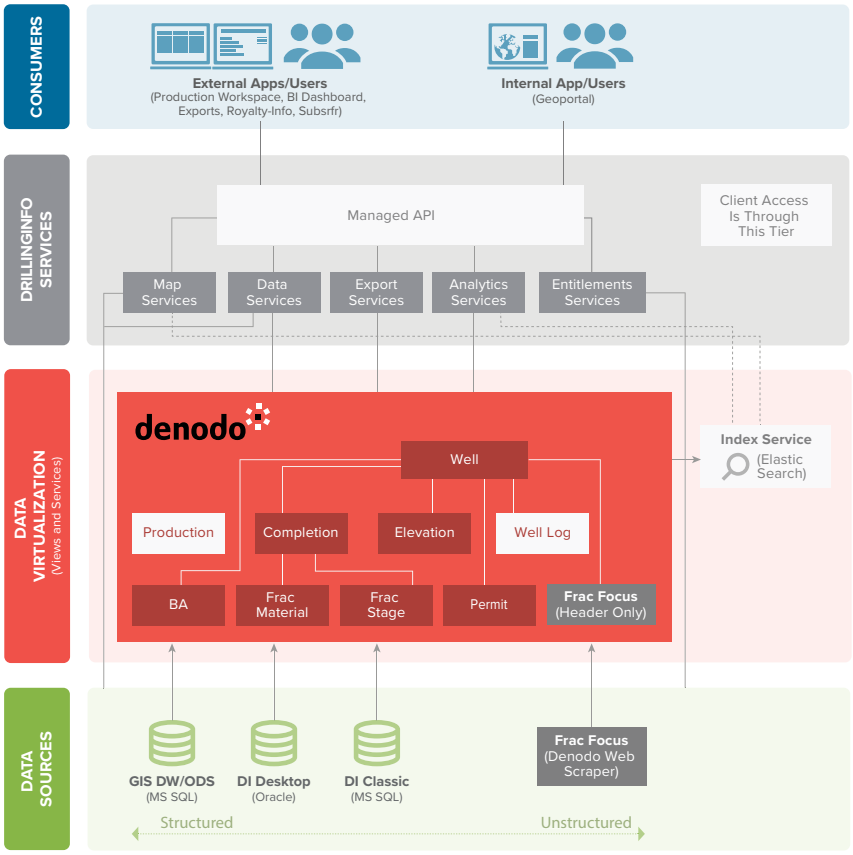
Drillinginfo

Drillinginfo is a leading SaaS and data analytics company for energy exploration decision support, helping the oil and gas industry achieve better, faster results. The company wanted to expedite the integration of data across the data warehouse and other sources, so as to provide it to data consumers more quickly. The product development team's delivery timelines were routinely at risk due to data availability and data consistency issues. As a result, the developers were directly accessing the data sources and in other cases suffering from severe delivery delays.

The Solution

Drillinginfo implemented the Denodo Platform, which uses data virtualization to establish a logical data warehouse that provides seamless access to the company's physical data warehouse as well as geo-spatial data and other sources.

The Denodo Platform connects to these data sources, combines the data, and publishes the resulting virtual views as data services, which are consumed internally by the application development team, analytics and decision support applications, and application data marts, as well as externally by their customers. Drillinginfo uses Denodo's caching mechanism to store data about business entities such as wells, completions, producing entities, permits, and so on, which are exposed as data services, analytics services, and map services. These services are then used by their internal application developers, as well as customers, to build applications.



Results

- Drillinginfo greatly accelerated its data services delivery and improved its capacity to serve more customers in the same time frame.
- Building usable web services for developing applications used to take 1 – 2 weeks; with Denodo's data virtualization solution, this process now takes less than a day.
- Drillinginfo can manage the entire data virtualization process with just one full time developer and one part time virtualization administrator.

A Leading Producer & Marketer of Fuels & Chemicals ("The Firm")

The Firm a subsidiary of Koch Industries, is a leading producer and marketer of transportation fuels, aromatics, olefins, polymers, biofuels, and related ingredients.

In recent years, the company was transitioning from key on-premises applications to SaaS applications. However, the company still wanted to integrate data from the SaaS applications with data from the on-premises applications. But the prospect seemed prohibitively costly, and Flint Hill was in search of a more sustainable solution. In addition, the company lacked an effective business intelligence infrastructure, so business users were building their own ad hoc semantic layers across the company's disparate data sources.

The Solution

Flint Hill implemented the Denodo Platform for data virtualization, which satisfied both needs simultaneously. First, the Denodo Platform established a data virtualization layer that provided a real-time, integrated view into data from the SaaS applications and data from the on-premises applications. Second, because the data virtualization layer serves as a unified access layer to all sources, it enables the company to easily establish a common semantic layer across the diverse data assets. Stakeholders are still free to create their own semantic layers, but a common layer enables more seamless collaboration.

Results

- Seamless integration between SaaS and on-premises sources for a single view of permissions across all applications
- Better collaboration with a common semantic model
- Accelerated development time: What might have taken 100 days with an extract, transform, and load (ETL) solution took just 25 days with data virtualization
- Saved cost with fewer resources: What might take a team of 10 using an ETL solution can be accomplished using 2 or 3 using data virtualization

A Premier Oil and Gas E&P Company ("The Firm")

The Firm is a leading petroleum and natural gas exploration and production company based in Texas. Recently, the company decided to modernize and streamline its IT infrastructure for better performance and efficiency. IT was not able to provide integrated data to business users quickly enough to serve business needs, so business users were manually integrating data from different systems, such as databases, spreadsheets, and real-time sensor data repositories, and building ad hoc data integration solutions. Business users were hindered in their efforts to quickly understand how wells were performing or how much they cost to maintain.

The Solution

The Firm implemented the Denodo Platform, which uses data virtualization to establish a universal, real-time data-access layer to the various sources, including transactional sources and cloud-based sources. Leveraging the Denodo Platform, The Firm established a cloud-based repository for industry subscription data, seamlessly covering multiple vendors, data types, and access protocols, and a logical data mart, streamlining organizational change by instituting standard data definitions across a wide variety of assets.

Results

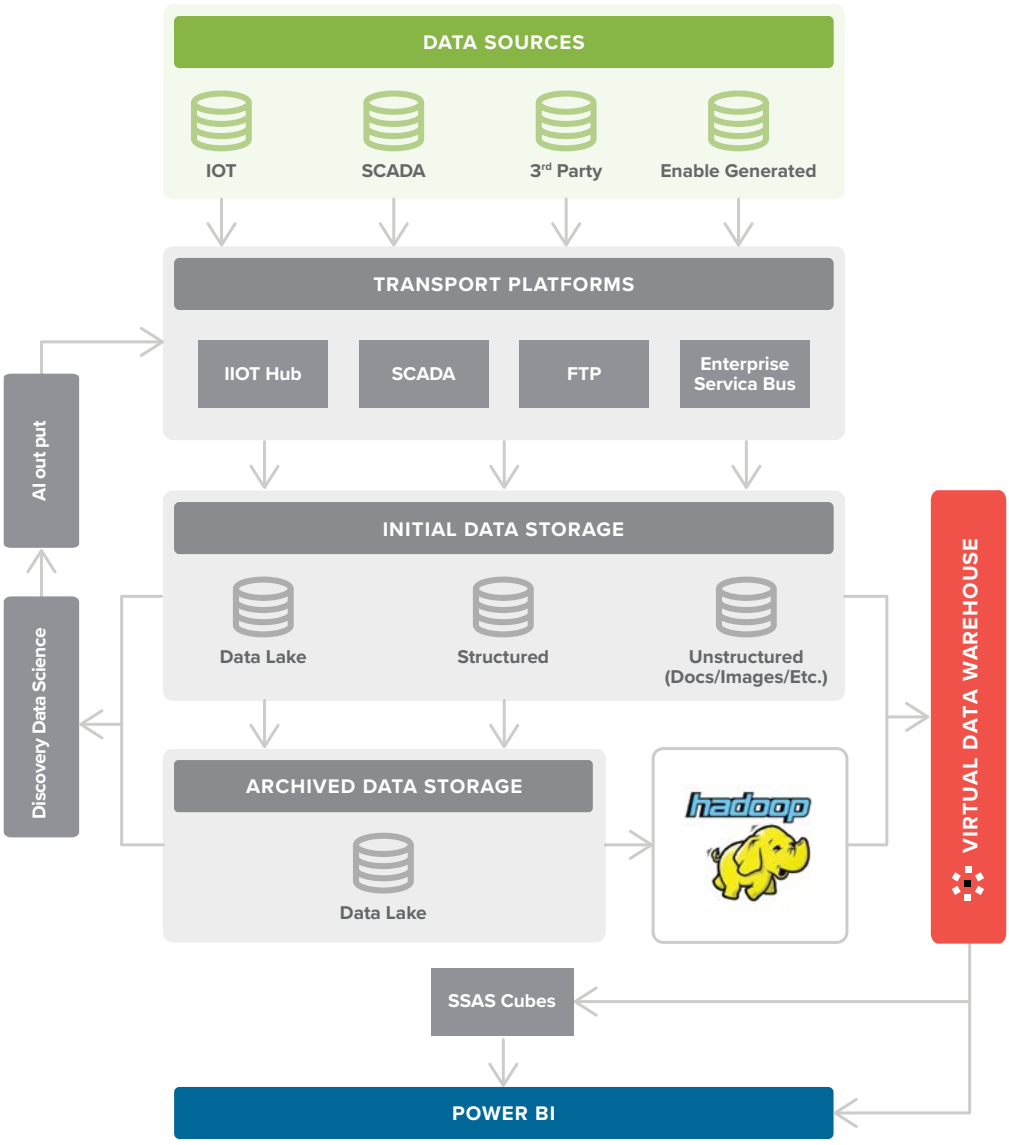
- Real-time access to a wider variety of data, enabling faster, more effective decision making
- Effective, flexible data security
- Accelerated development time
- Granular auditing of usage across the entire infrastructure
- Less costly to maintain than traditional physical data warehouse solutions

A Leading Developer of Midstream Energy Infrastructure Assets (“The Firm”)

The Firm owns, operates, and develops strategically located natural gas and crude oil infrastructure assets serving major producing basins and markets. On a routine basis, the company captures meter related data, such as gas measurement and flow, which is stored across multiple systems, and combines this data with leak-detection systems and other sources. The Firm needed a way to combine this data more quickly and less expensively.

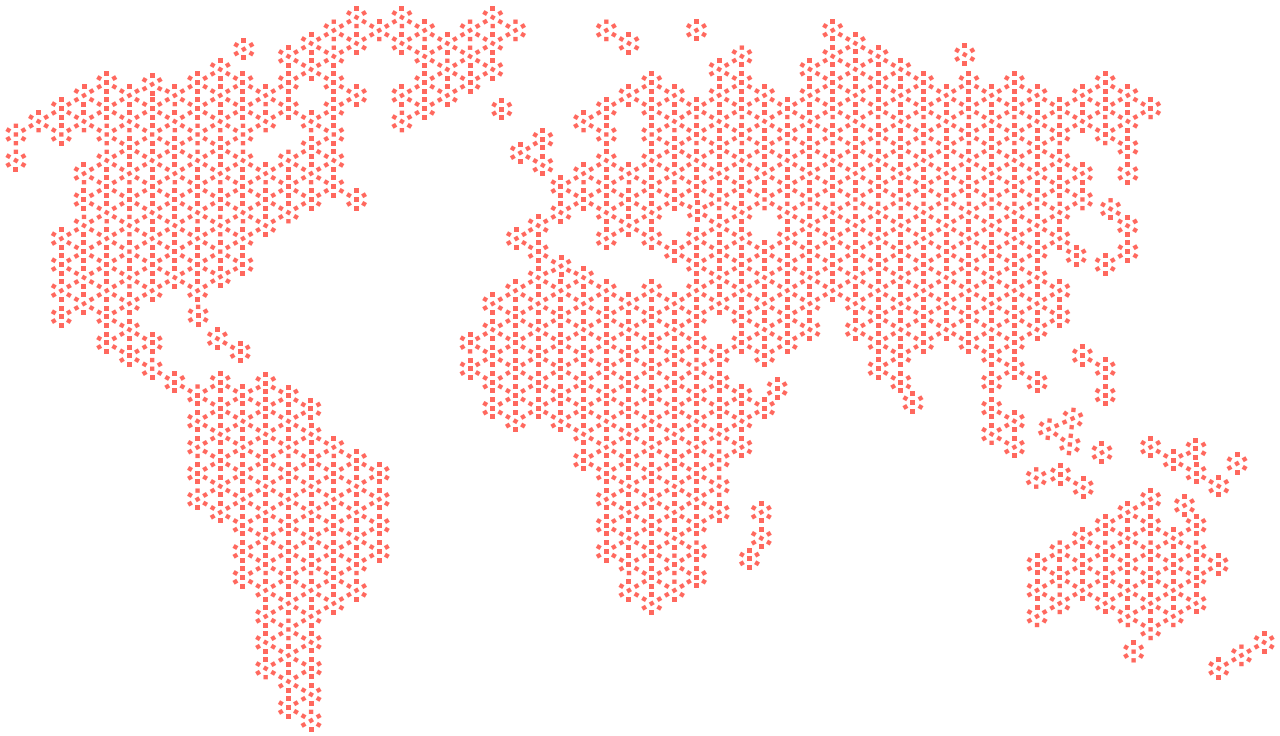
The Solution

The Firm implemented the Denodo Platform, which uses data virtualization to establish a “master meter” that offers a canonical view of the data across all applicable metering and data enrichment sources. This view is compiled in the manner of a virtual master data management (MDM) system, in that it establishes which records take precedence over others, and which are the authoritative sources.



Results

- The “master meter” provides greatly accelerated access to integrated, enriched metering data.
- By avoiding data replication and its associated data-storage costs, The Firm dramatically reduced data-integration expenses.
- By acting as a “virtual MDM system,” the master meter ensures that stakeholders always act on the highest quality, most authoritative data.



Simplicity BI

SimplicityBI is a leading Data Management consulting company solely focused on solving data challenges, end to end. We are typically involved in implementing multiple components of the data pipeline, from your sources to your dashboards and everything in-between. The in-between usually involves multiple technologies, Data Virtualization often being the technology we leverage to create a Logical data fabric Architecture.

denodo

Denodo Technologies is the leader in data virtualization providing agile, high performance data integration, data abstraction, and real-time data services across the broadest range of enterprise, cloud, big data, and unstructured data sources at half the cost of traditional approaches. Denodo's customers across every major industry have gained significant business agility and ROI.

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