A Top 25 Fortune Global 500 Energy Producer Unifies Data to Lead the Charge in Oil E&P and New Energy

This global leader in the energy sector is not only one of the seven supermajor oil companies but also a top 25 company on the Fortune Global 500 list. Renowned for its operations in oil and gas exploration and production, the company is also making significant strides in new energy domains such as wind and solar power. With over 130 countries in its operational portfolio and a workforce of more than 100,000 spread across the globe, this company is on a mission to lead the global energy transition.

As part of this transformation, effective data management and virtualization have become central to its strategy, enabling seamless integration of technical, operational, and document-related data. By using modern data integration solutions, the company aims to excel in both traditional energy operations and innovative new energy initiatives, ensuring a sustainable and resilient future.

Challenges

The company faced a number of technical and operational challenges in its attempt to accelerate the delivery of data to project teams:

1. **Siloed Data Systems:** The company's applications and data were often siloed, preventing efficient cross-communication between systems.
2. **Data Governance and Standards:** The need for a standardized data model across multiple domains was pressing, especially as they lacked comprehensive data governance capabilities.
3. **Performance Bottlenecks with Web Services:** Web services used for data querying faced frequent performance issues, especially when handling large volumes; use of these services resulted in timeouts and long query times.
4. **Document and Metadata Management Challenges:** Managing documents and metadata for largescale projects, such as offshore wind farms, posed significant challenges. Multiple electronic document management systems (EDMS) were involved, leading to performance bottlenecks when aggregating metadata from a variety of systems.
5. **Complex Hybrid Cloud Architecture:** The company's infrastructure spanned on-premises data sources and both AWS and Azure cloud platforms, creating a hybrid environment with distinct operational challenges related to performance and security.
6. **Data Accessibility and Security:** Strict cybersecurity measures prevented direct access to cloud databases for end-users, necessitating security solutions for data exposure and access.

Solution

To tackle these challenges, the company implemented a multi-faceted approach to logical data management:

Data Virtualization: The company deployed the Denodo Platform to act as a centralized data access layer, enabled by data virtualization, simplifying the integration of data across different systems. The virtualization of documents,through metadata, enabled the management of multiple EDMS across project phases, from basic engineering to commissioning. The data virtualization layer simplified the complexity of managing these systems by aggregating metadata such as document revisions and project progress. This approach exposed document-related data through a common data model, supporting the delivery and revision process across multiple project phases.

A Common Data Model: The creation of a common data model, based on industry standards like Capital Facilities Information Handover Specification (CFIHOS), standardized data management across exploration, production, and renewable energy projects, aligning the data with both technical and business needs. This model was also applied to document-related data for consistency across different phases of largescale projects.

Layered Caching and Performance Optimization: Instead of relying on complex, outdated caching systems, the Denodo Platform's native caching capabilities were leveraged to handle large document-related queries more effectively. This approach enabled document metadata to be accessed efficiently, for smoother data retrieval processes even under heavy workloads.

Governance and Data Domains: The Denodo Platform's capabilities enabled the company to integrate data governance policies into its data virtualization model. By virtualizing data across 15 different technical domains, the Denodo Platform facilitated better control and oversight, so data governance policies could be enforced more consistently. This made it easier to manage document-related data, enabling proper data ownership and governance across different business units.

Hybrid Cloud Infrastructure: Using the Denodo Platform, the company streamlined the management of its hybrid infrastructure, integrating data from both AWS and Azure platforms and on-premises sources. The Denodo Platform acted as a secure intermediary layer that unified access to data stored across the two cloud environments.

Benefits

By unifying the company's data, the Denodo Platform was able to:

Improve Query Performance: Through optimized caching strategies, query times were significantly reduced, often from 30 minutes to about 5.

Enhance Data Accessibility: By implementing the Denodo Platform, the company was able to securely expose data to end-users through tools like Power BI, while still adhering to cybersecurity standards.

Easily Implement Standardization and Governance: The common data model and clear data governance frameworks enabled consistent, reliable data across 15 technical domains, aiding in project management and operations.

Maintain Site Efficiency: The company was able to leverage streamlined site maintenance workflows and agile compliance reporting.

Provide a Scalable, Future-Ready Data Infrastructure with a 360° View of Master Data: The hybrid approach enables the company to seamlessly manage data across its on-premises, AWS, and Azure data sources without requiring users to directly access any databases. This not only maintained security and improved data availability but also enabled a 360° view of master data to support the diverse needs of the company's global energy projects.

Unify Document and Metadata Management: By enabling the company to aggregate metadata more quickly, including information on document revisions and project progress, the Denodo Platform provides better tracking across largescale projects like exploration and production (E&P). This streamlined process enabled speedy access to data, improved the monitoring of project phases, and enabled better management of key performance indicators (KPIs).

The company's experience with logical data management is a critical part of its broader mission to lead the energy transition. By overcoming significant challenges in data governance, performance, and cloud infrastructure, the company has positioned itself at the forefront of innovation in the energy sector, supporting both traditional energy projects and next-generation energy initiatives.