



MODERNIZATION | PRODUCT BUILD

# Global Energy Sector Innovator

## Data Localization

Our client is a Global Energy Sector Innovator with operations in more than 70 countries. They work across the full energy lifecycle: finding resources, drilling, and bringing production online. Their size and reach mean they face strict local rules, especially on how and where data is stored. The company is known for its innovative solutions, particularly in areas like well construction, well intervention, and hydraulic fracturing.



### Review of Challenges

As a global company, our client must comply with different data storage laws in each country where it operates. Some of these laws, known as data localization laws, require that data be stored within the country of origin. This means the company cannot use cloud services that store data outside those countries.

However, their systems were originally designed to store all data in the United States, which did not meet these legal requirements. Additionally, the data itself was inconsistent: country information was often missing or formatted incorrectly. Without a reliable way to tag data by its origin, complying with data localization laws was not possible and put the organization at risk of legal and financial penalties.

### Utilized Technology Stack

- Cloud: GCP, Microsoft Azure
- Database: MongoDB Atlas
- Backend: ASP.NET Core, MongoDB C# Driver

### Our Solution

To meet legal requirements, gravity9, in collaboration with MongoDB, implemented a version of Atlas Global Clusters with data sharding based on geographical location. This setup allowed data to be stored in specific countries such as Brazil, Qatar, and Saudi Arabia using cloud services like Microsoft Azure and Google Cloud Platform.

To make this work, we enhanced data records to include more comprehensive location information that can inform our persistence strategy. The modifications can be fed into an evaluator to determine where the data should be stored. Existing data was updated using migration scripts, and new data was created with the location information built in from the start. We also updated their microservices so that all applications could operate seamlessly with the new setup.

The result was scalable and powerful: as data came in, the system instantly knew where it belonged. Records were stored in the correct location, enabling them to comply with legal requirements without disrupting operations.



## Our Approach

We began by designing a clear plan in collaboration with our clients' architects. Together, we identified which countries required local data hosting and set up clusters across four regions: the U.S., South America, and two Middle East locations. Each region operated as a replica set, ensuring the system remained resilient and reliable. Next, we addressed the data itself. We standardized its format, created scripts to fill in missing details, and added new location information so every document could be properly localized.

At the same time, we updated their microservices to ensure all applications could read and write data without disruption. The process wasn't always straightforward. Access to tools and environments was limited, so much of the testing had to be done side by side with their developers. By working closely together, we overcame these challenges and kept the project on track.

## Subsequent Outcomes

By the end of the project the client had a fully functional system that ensured data was stored where it needed to be. Data from countries with localization laws remained within their borders, while all other data defaulted to storage in the U.S.

This approach also enhanced reliability. With clusters running across multiple regions and cloud providers, our client gained a more robust and flexible platform that can scale with future needs. The project was delivered on time, and the solution is now an integral part of their daily operations.

## Client Feedback

Our results were welcomed by the client and the project successfully addressed a complex regulatory challenge, and it was delivered on time. MongoDB also recognized our contribution, praising our patience, teamwork, and commitment to going the extra mile.

The client appreciated our persistence and the clear, practical way we delivered a solution that worked effectively in the real world. This has enabled future conversations around how to best enhance retained data for a variety of localized use cases. This has also formed a working foundation for how data can be optimally governed while prioritizing regulation and minimizing operational risk.

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**“gravity9 delivered a scalable solution that ensured compliance with strict data localization laws, without disrupting operations.”**

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