Laredo Migrates to Serverless Architecture on AWS, Sees $60,000 Net Gain Per Month

Laredo Petroleum Inc. (Laredo) saved $100,000 by going serverless on AWS and unlocked a net gain of nearly $60,000 per month. The independent energy company formerly operated on premises, but data was fragmented and difficult to query. So the company built a serverless data lake on AWS Lake Formation. The resulting centralization of data enabled real-time decision-making through Amazon Athena and Amazon SageMaker. Now Laredo can proactively monitor and prevent well leaks, reduce flare permit violations, and pursue new revenue opportunities.

Energy company Laredo Petroleum Inc. (Laredo) acquires, explores, and develops oil and natural gas properties, primarily in the Permian Basin of West Texas. Overseeing 1,302 wells and employing 257 people, the Oklahoma-based company is an independent operator focused on growing through acquisition and data use. However, Laredo's legacy on-premises data and analytics infrastructure prevented the company from having a holistic view due to fragmented data that was difficult to query.

"One of our largest challenges was the disparate locations of our data," says Brandon Brown, vice president and chief information officer at Laredo. "We have an aggressive digital strategy, and the move toward real-time decision-making is a critical component. None of our legacy systems could support that."

Laredo knew it needed to modernize its architecture by centralizing data access and enabling real-time well monitoring for proactive risk management and revenue generation, so the company migrated to Amazon Web Services (AWS). On AWS, Laredo quickly built a serverless data lake, increasing resiliency and scalability while optimizing costs and operation time. Now the company can monitor, respond to, and prevent adverse well events in real time. And although many companies in the energy sector have shut down wells and lost money during the COVID-19 pandemic, Laredo has seen a monthly net gain of nearly $60,000.

Searching for a Scalable, Cost-Effective Solution

Prior to using AWS, Laredo operated an expensive legacy on-premises system. "We had everything from legacy database systems to file shares that stored data, including real-time data," says David Benham, senior data scientist at Laredo. The fragmented nature of the architecture created data silos, which hindered staff members from accessing and querying the data they needed. That made it difficult to drive insights that would inform Laredo how to improve its operations and reduce risk.

Creating a data lake in the cloud provides a scalable, cost-effective solution that would centralize data for Laredo. This would simplify querying and real-time decision-making, enabling access to new insights that were not available on premises. The Laredo team planned to build a data lake using AWS Lake Formation, a service that makes it simple to set up a secure data lake in days.

Unlocked an early net gain of $60,000 per month.

Company:	Laredo Petroleum, Inc.
Industry:	Oil & Gas
Country:	United States
Employees:	257
Website:	http://www.laredopetro.com/

About Laredo Petroleum, Inc.

Headquartered in Tulsa, Oklahoma, Laredo Petroleum is an independent energy company focused on the acquisition, exploration, and development of oil and natural gas properties. A low-cost operator in the Permian Basin, it oversees more than 1,300 wells.

Benefits

- Centralized data and delivered data-driven insights
- Saved $100,000 by going serverless
- Unlocked an early net gain of nearly $60,000 per month
- Uses proactive monitoring algorithms to prevent oil and gas leaks
- Reduced flare permit violations
- Minimized environmental impact

AWS Services Used

- Amazon Athena
- Amazon SageMaker
- AWS Lake Formation
- AWS Glue

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>
> —Brandon Brown, vice president and chief information officer, Laredo Petroleum, Inc.

Laredo chose AWS for its scalability, cost-efficiency, innovation, and willingness to understand the company’s needs and expectations. Consulting AWS Professional Services—a global team of experts who help businesses achieve specific outcomes related to enterprise cloud adoption—was a seamless experience for the Laredo team. “The professionalism AWS brought meant we didn’t have to teach the team anything,” Brown says. “In fact, AWS taught us along the way.”

Optimizing Costs, Time, and Decision-Making in a Two-Stage Migration

Laredo began its two-stage migration in March 2020 after completing a cloud vendor selection process and confirming the availability of a secure connection to AWS. First, Laredo employees designed a proof of concept for a data lake. The company replicated its data to Amazon Simple Storage Service (Amazon S3), an object storage service that offers industry-leading scalability, data availability, security, and performance. Then the Laredo team implemented crawlers from AWS Glue—a serverless data integration service that makes it simple to discover, prepare, and combine data for analytics, machine learning (ML), and application development—and used these crawlers to build metadata and capture data governance attributes. Laredo could access the data through Amazon Athena, an interactive query service that simplifies data analysis in Amazon S3 using standard structured query language. The company finished the proof of concept under budget and ahead of schedule, then applied the leftover funds to the second stage of migration.

Laredo then began to fine-tune the proof of concept for serverless architecture. “We turned company data into near-real-time datasets to simulate streaming and begin to deploy machine learning and analytical solutions into these pipelines,” Benham says. The company used the same tooling from the proof of concept but added other AWS services—such as AWS Step Functions, a serverless orchestrator that assembles functions into business-critical applications—as well as rules for stopping and starting events.

Laredo also implemented Amazon SageMaker—which companies can use to build, train, and deploy ML models for virtually any use case—to deploy ML models into its pipelines. Laredo used ML and real-time data to monitor its wells, prevent adverse events before they could occur, and respond to emergencies quickly. The company also minimized its environmental impact. “We take pride in having one of the lowest flaring and venting rates in the Permian Basin,” Brown says. “Proactive monitoring on AWS helps us quickly identify and remediate issues that could result in flaring or venting natural gas.”

By going serverless, Laredo optimized costs, time, and decision-making. The company no longer has to manage physical equipment, and it only needs to pay for the queries it runs. “We increased the number of objects in our data lake from 200 to more than 900 with a few clicks of a button, a few parameter changes, and only a $75 difference to our monthly bill,” says Brown. Centralized data access also reduces corporate risk: because employees can access data governed by stakeholders, they are better able to make informed, intelligent decisions. And with improved data-driven insights, Laredo has optimized operations in the field, unlocking an early net gain of nearly $60,000 per month. The migration from on-premises to serverless infrastructure saved the company $100,000 within the first year.

ML enables Laredo to engage in management and optimization by exception; these operational strategies advise team members to intervene in a process only if there is a significant deviation from planned outcomes. “We’ve added proactive monitoring using Amazon SageMaker to look for leaks at our tanks and in our corridor lines,” says Benham. As a result, Laredo can reduce the risk of unexpected on-premises issues.

Succeeding as an Independent Oil and Gas Company

Laredo has adopted the efficient project-management techniques it learned from AWS. “AWS elevated our standards, and we’re in turn elevating our expectations for our vendors,” says Benham. The company plans to take advantage of additional AWS services in the future, to expand its data lake infrastructure to its drilling, completions, and subsurface teams, and to amass historical data to analyze revenue and risk trends.

Using AWS services, Laredo completed its migration quickly, unlocking new insights for proactive risk management and revenue generation. It also avoided the costs of an on-premises system and achieved real-time decision-making to optimize operations and save more money. “Other companies are curious how we were able to do so much in such little time,” says Benham. “People are taking note.”

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