Global consultancy Milliman powers award-winning Arius insurance reserving software using Azure Data Explorer

Milliman is an international consulting and actuarial firm based in Seattle, Washington. With more than 60 offices around the globe, and more than 4,000 employees, the company offers personalized consulting services and technology solutions in employee benefits, healthcare, investments, life insurance, financial services, and property and casualty insurance. Milliman's award-winning insurance reserving software Arius® recently joined forces with Microsoft to expand its database capabilities. As the complexity of Arius Enterprise's clients grew, so did the volume and complexity of data demands, putting pressure on the system's architecture. The Arius team turned to Microsoft Azure Data Explorer to support its dynamic growth, gaining speed, simplicity, and scale in the process.

Milliman **Arius**®

Customer
Milliman
Website:
www.milliman.com
www.actuarialsoftware.com
Country: United States
Industry: Insurance
Customer size: Large (1,000 - 9,999 employees)

Customer profile
Founded in 1947, Milliman is an independent risk management, benefits, and technology firm with offices in more than 60 cities around the globe.

Software and services
Azure Data Explorer
Azure SQL

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Ari Villaça,
Cloud Solution Architect,
Milliman

Approaching data differently

"It was around two years ago, in April or May of 2018, that we first started encountering some performance issues with some of our larger clients," explains Ari Villaça, a cloud solution architect at Milliman. "At least twice daily, I would get alerts about data ingestion or queries that were taking in excess of 20 minutes to run—significantly longer than what we wanted to achieve. If you have an on-demand data aggregation solution that takes more than 10 minutes to obtain results, it sort of defeats the purpose."

The system was designed with a classic relational database, using a dynamic data warehouse star-schema, supporting more than 50 user-defined dimensions and measures—data being ingested though a traditional extract, transform, and load approach. The original database architecture of Arius had begun to require too much time and too many compute resources. "We were hesitant to change, but were reaching a plateau with what we could do with our existing solution," says Charles Hoffman, principal and director of software development for Arius at Milliman. "Adding more memory and compute resources no longer provided performance benefits, but simply increased costs. We needed to scale up, simplify, and add more horsepower; this meant thinking about a redesign."

Supporting growing business

As the Arius team looked to the future, they knew that clients and new prospects were only going to increase the complexity of their queries and the amount of data they were loading into the system—the volumes of which the current system was ill-equipped to handle. So, Hoffman and his team began exploring their options.

"We saw a presentation where Azure Data Explorer was used to query GitHub public data: about a billion rows of read-only data in seconds," explains Villaça. "Since we work with read-only data, I immediately thought we could evaluate this technology and see what happens."

The Milliman team began investigating the capabilities of Microsoft Azure Data Explorer. "We started playing around with it, and what it revealed was extremely promising," says Villaça. "From the beginning, I thought it would put us in a better position to handle the volume of data that was about to come."

With an existing base in SQL, the Arius team needed to understand what a move to Azure Data Explorer would entail. "We have a lot of custom logic in our stored procedures in SQL," explains Rajesh Jampala, Arius' database engineer. "We wanted to see if we could build that kind of logic in Kusto Query Language (KQL). Processing flat data is one thing, but when you have a lot of business logic in your data extraction, you need to see how that would affect things. And we've been impressed with how Azure Data Explorer has been performing."

Offering a synergistic solution

After evaluating several restructuring options, the team at Milliman decided to modify their Azure solution to support two data approaches, dependent on client size. For its smaller clients, the company continues to offer its existing SQL-based solution, and for larger clients, Azure Data Explorer. To do this, the Arius team branched its application code, allowing Azure Data Explorer to receive all data processing requests, complex queries, and analytics. This allowed Milliman the flexibility to keep all its business logic intact and significantly simplify the architecture to load raw data and run fast queries

Microsoft

"With Azure Data Explorer, we have great performance and are confident that our new data solution can handle very large data volumes without incurring any performance costs."

Charles Hoffman,
Principal and Director of Software
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without creating multiple dimensions, precalculating metrics, and optimizing the indexes for each customer.

"It was fairly straightforward to move our existing implementation to Azure Data Explorer," explains Paul Erickson, senior engineer for Arius at Milliman. "We didn't need to spend a lot of time rearchitecting our core solution or database schema. Our existing SQL query logic was able to be quickly implemented in KQL, which also allowed us to replace some of our more complex C# code and SQL stored procedures. In terms of speed, although we had to make some modifications to the size of the files we were sending to Azure Data Explorer, the end result was data loads running in half the time and queries executing in a fraction of the time—the 20-minute queries now take less than a minute. With Azure Data Explorer, we have great performance and are confident that our new data solution can handle very large data volumes without incurring any performance costs."

Overall, the benefits of moving Arius to Azure Data Explorer included a quick solution port, a straightforward shift from SQL to KQL, and doubling rates of ingestion—changes that have helped Milliman's Arius offer large, sophisticated insurers greater performance at a reduced cost, strategically position the software solution for future growth, and bring home the prized title of Cloud Technology Solution of the Year at the 2020 InsuranceERM Awards.

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