Why Fathom Ditched MySQL, Redis, and DynamoDB to Power the World's Fastest Website Analytics Platform

>60%

Reduction in Database Total Cost of Ownership (TCO)

1,000x

Improvement in Query Performance

30s

For Data Export Time (Down from Hours)

> We are now all–in on SingleStore managed service, which has allowed us to drop Redis, DynamoDB and MySQL, saving us an absolute fortune in monthly costs, while dramatically improving the performance.

Jack Ellis,
Fathom's Technical Co-Founder

Business Goals

Fathom is a rapidly growing website analytics software company focused on providing a simple, lightweight, privacy-first alternative to Google Analytics. Their user-friendly, privacy-centric approach proved popular with users, resulting in rapid growth and the need to effectively scale.

Jack Ellis, Fathom's technical co-founder, explained, "For over a year, we'd been struggling to keep up with our analytics data growth. Fathom had been growing at the speed of light and our data ingestion had been going through the roof. Our popularity has been great for business and user privacy, but it wasn't good for application performance."

Fathom's business goals included:

- The ability to remain independent, self-funded, and sustainable so they would not have to compromise data privacy by selling advertising and user data.

- Meeting the needs of thousands of users with billions of page views across all organization sizes, from small businesses to Fortune 500 companies.

- Improving the user experience, performance, and scalability of the application.

Technology Requirements

The database technology capable of supporting Fathom's website analytics application needed to meet several important criteria:

Massive Concurrency
Fathom's rapidly growing user base required thousands of concurrent reads and writes without running into issues.

Manageable Cost
The total cost of ownership for the database needed to stay under $5,000 per month.

Fast Time-to-Value
The ideal database would offer ultra-fast, real-time analytics and high-performance queries to help users see their website metrics faster.

No Roll-Ups
The database solution needed to support aggregations across billions of rows and respond in milliseconds, not minutes.

High Adoption by the Enterprise
Fathom wanted to work with mature software that had customers much larger than itself using it.

Customer Success
The database provider would deliver great customer support and well-written, easy-to-understand documentation.

Fully-Managed Database
Finally, Fathom wanted a fully managed database-as-a-service. Jack explained, "We're not database experts and would rather have true professionals manage something as important as our customers' analytics data."

SingleStore

Fathom started out by using MySQL with Amazon RDS as the database to power its application, but the team encountered several challenges keeping up with their analytics data growth, including:

- **Cost-prohibitive** deployment with Amazon RDS for MySQL

- **Poor scalability,** as MySQL was struggling to handle table aggregations at a medium scale (despite the fact they were pre-aggregating data)

- **Poor performance** with dashboard requests getting timed out

- **Connection limits**

- **Limits on IOPS**, which meant they had to overspend on provisioning IOPS with RDS, and had no ability to scale those IOPS down with ease, leading to ever-increasing cost of ownership

- **Lack of support** for data drill-downs and filtering

Why SingleStore Managed Service?

Fathom reviewed six other databases including Elasticsearch, TimescaleDB, InfluxDB, Rockset, ClickHouse, and Amazon Athena — and ultimately **chose SingleStore Managed Service** to support its growing website analytics application.

SingleStore enabled fast ingestion, high performance queries, and real-time analytics for Fathom through a fully managed, unified database-as-a-service supporting millions of real-time queries across tens of thousands of users. The benefits included ultra-fast data ingest, MySQL wire protocol compatibility, sub-second query latencies, one-click deployment, and a petabyte-scale cloud-native data platform.

Jack explained why SingleStore was **Fathom's top database choice**, "I want the whole package. I like speed, but I also want to feel good about what I'm using. I want the people we're working with to be good people. And the technology has to fit into my existing expertise so that the learning curve isn't too large."

One of the key selling points for Fathom was that they didn't have to rewrite any queries - thanks to MySQL wire protocol compatibility - which saved them weeks of work.

Fathom was also able to replace **Amazon Elasticache (Redis)** as their application cache and is using SingleStore for all their caching needs, thereby simplifying their architecture and driving down costs significantly.

Six months after migrating their analytics database, Fathom also **migrated from Amazon DynamoDB to SingleStore** for their ingest hash tables, which they use to track whether users are unique. They were previously nervous about using a non-serverless database for this but, after seeing how quickly and easily they could expand the cluster (without incurring any downtime), they were confident it could work for their operational needs. **More importantly they ended up saving $3,000/month just from migrating out of DynamoDB.**

In Jack's own words — "With SingleStore, we can perform tens of thousands (probably more at times) of inserts per second, along with utilizing it for all key/value lookups (for which we previously used DynamoDB). It handles all of our application rate-limiting and supports our unique tracking methodology, all at a fraction of the costs — what a time to be alive."

Fathom was previously using:

- **RDS MySQL** for their core application database and analytics
- **Redis** for application cache
- **DynamoDB** for high-scale ingest hash tables

And now they're using SingleStore for everything.

As Jack would put it "In March 2021, we moved all of our analytics data to the database of our dreams."

fathom/

Business Outcomes

Enabled the Delivery of User Requested Features

Customers were demanding the ability to filter through their dashboards, but Fathom had not been able to support that. SingleStore solved this and allowed the team to ship a huge update to their software.

SingleStore has also laid the foundation to develop other new features that customers have been asking about for years. For example, they recently shipped an incredibly flexible API for developers, which wouldn't have been possible before.

Optimized Infrastructure Spend for Sustainable Pricing

"A huge part of running a software business is reaching this inevitable fork in the road: you can choose to raise prices when faced with increased costs or optimize your infrastructure spend for better margins and keep the prices the same. We chose the latter, as we felt it better serves our existing and new customers. We were able to do this by changing our technology stack to continue to be sustainable long term without continuously increasing prices across the board," Jack explained.

Fathom's total cost of ownership was increasing, and DynamoDB's cost was guaranteed to rise fast due to their growth. By saving huge amounts of money with SingleStore, they've been able to invest the savings in other areas of their business. Since Fathom operates as a zero-debt company, every dollar they free up can be re-invested for compounded growth.

Fathom has a fixed monthly expense with SingleStore, and their cluster has the capacity to comfortably support huge amounts of traffic from enterprise and large SMB companies. They are able to better serve their bigger customers without needing to raise prices for their platform or suffering from unsustainably low margins.

Fathom is gaining rapid adoption and is on an accelerated growth curve today. Powered by SingleStore, Fathom can now scale limitlessly, and deliver an impactful customer experience to power its privacy-centric website analytics platform, effectively disrupting the status quo.

Freed up Significant Mental Bandwidth

Fathom Analytics originally used a dedicated data-export environment in AWS Lambda, which regularly ran for many hours, costing them a small fortune. In addition to that, the team frequently encountered data export errors for the biggest customers, resulting in hundreds of automatic retries followed by hours of work preparing manual data exports. Since moving to SingleStore, data exports to AWS S3 are achieved via a single query which finishes **in less than 30 seconds**. The Fathom team can now spend that time on improving the platform.

This simplified infrastructure freed up significant mental bandwidth within the company. Fathom is now able to focus on developing their product rather than worrying about their data.

Faster Application & A Better Customer Experience

"We took our analytics from slow, complex, bloated, rigid, and unscalable to flexible, fast, and powerful. Moving to SingleStore changed our lives," recounted Jack.

Fathom's query speed increased by more than **1,000x** on average and is tens of thousands of degrees faster (than RDS), thanks to SingleStore. For some of their biggest customers and datasets, Fathom was able to go from 20+ minutes processing time to just 100ms with SingleStore, a staggering improvement of **12,000x**. The data is now fully real-time and their customers can filter on any field they wish. Fathom can also now use a single query to update and delete hundreds of millions of rows without using LIMIT and switched from UPDATE to INSERT to better support scaling (appends perform better than updates).

To learn more, check out Jack's blogs on Building the World's Fastest Website Analytics, Making the World's Fastest Analytics Even Faster, and Why We Ditched DynamoDB.

SingleStore