

Piedmont Healthcare

Analyzing 1.5 trillion data points 1,000 times faster to improve patient care

Piedmont Healthcare's SQL Server-based analytics were not keeping up with growth. Leadership demanded faster access to accurate data. So they brought in Exasol.



Challenge

Producing insights from 40TB of data



Solution

Producing insights from 40TB of data



Benefits

Faster insights for better healthcare outcomes

"With Exasol I don't have to anticipate all the ways a user might want to query the database."

Mark Jackson, Executive Director of Business Intelligence, Piedmont Healthcare

10-1000x

Performance improvement over SQL server workloads

6 hours to 6 minutes

Drop in data mart refresh time for a single table

4 hours

Saved per day in processing time for clinical dashboard data marts

30,000 - 40,000

Queries run per hour during business hours (with peaks of over 100,000)



Every year, two million people are treated at Piedmont Healthcare's 11 hospitals, 60 urgent and quick care locations, and 550 physician practices across the Atlanta metropolitan area. Annually, the provider oversees 88,000 surgeries, delivers 16,000 babies, and completes nearly 400 organ transplants.

All this generates a lot of data. Piedmont's Electronic Healthcare Record (EHR) system has over 40TB of clinical, operational, and financial data. On top of this are ERP, CRM, patient surveys, and streams of information flowing in from its call centers. To reduce harm and improve patient satisfaction, delivering actionable insights to hospital leaders is key.

The challenge

Piedmont Healthcare had only four hospitals when Mark Jackson joined the company. Siloed data practices were limiting its ability to expand care to more people. Each hospital had its own EHR system with data aggregated in a Microsoft SQL Server data warehouse. Piedmont's leaders relied on data-driven insights about the care provided to patients, like infection rates, side effects of medication, and long-term patient prescriptions, to reduce readmissions and claims. But the system was too slow for dashboarding. A work around was to extract data to Tableau, but only if the analytics were basic.

It became clear this strategy wouldn't scale. Mark's expertise in Tableau meant he could create complex and informative dashboards, but SQL Server was never going to provide the performance needed — it wouldn't be fast enough unless the amount of data being made available was scaled back, but the complexity of the questions only increased.

The solution

Mark began exploring whether an in-memory database specifically designed for analytics was the answer after meeting a member of the Exasol team at a Tableau conference.

The Piedmont Healthcare team set up Exasol on a laptop for a quick test. Even on a low-powered laptop with no tuning, Exasol boosted performance. Following a more thorough test on proper hardware, Piedmont adopted Exasol as the company's high-performance data warehouse platform in 2017. Working on one data source at a time, the team decommissioned all large extracts in Tableau.

Today, with 11 hospitals and hundreds of other sites, Piedmont Healthcare has around 1.5 trillion data points in Exasol production tables. Since the implementation, Mark has been able to improve the company's SQL code structure for better performance to maximize Piedmont's investment.

"We built a comprehensive metric framework with anomaly detection, full record level detail and logic transparency on top of Exasol at a pace of about 20 new metrics per month. That is one thing that would have never been possible with our previous technology."

**Mark Jackson, Executive Director
of Business Intelligence,
Piedmont Healthcare**



11 hospitals

1.5 trillion

**data points in Exasol
production tables**

Benefits

• Simplified setup

Wait times for several query workloads have reduced from over 10 minutes down to a few seconds thanks to the improved SQL code data layer. Performance has improved from 10x to 1000x over SQL Server for the same queries. Since Exasol is auto tuning, Mark and his team don't have to try and anticipate all the ways a user might attempt to query the database. Refresh time is also reduced significantly by constructing incremental data loads instead of full extract refreshes for data marts.

• Faster insights

A faster, more reliable data layer feeding Tableau means the team can ask as many questions as they like, test more assumptions, automate more reports, and deliver results to those that need them sooner. For example, the comprehensive metric framework with full record level detail, anomaly detection, and logic transparency built on top of Exasol, provides insights for around 500 metrics which are refreshed daily. New metrics are introduced into the framework at a pace of around 20 new metrics a month. In addition, Piedmont can now make Python geospatial API calls directly in the database. Finding out how many patients live within a 30-minute drive of a hospital (an essential question in the pandemic) now only takes seconds.

• Powering innovation

For Mark and his team, it is important to have confidence in vendors. Reliable performance doesn't just mean faster answers to queries. It means better outcomes for patients and greater harm reduction. "It is clear that Exasol has a genuine interest in our success," he says, "and they act as a trusted advisor." But confidence also means being able to evolve together. Piedmont Healthcare intends to build out its machine learning and AI capabilities in the coming years. It also plans to explore the idea of a data "lakehouse" for archival and accessibility of rarely accessed information. Leveraging Exasol on the cloud has the potential to enable the team to scale these projects up and out much faster. "I think Exasol is well positioned to execute on both these ideas with us," says Mark.

