



Medicaid Program

Vertica Analytics Platform brings a healthy dose of speed and scale to complex analytics workloads, essential for transforming healthcare delivery and financing for multi-billion-dollar Medicaid programs.

Healthcare Reimbursement in Transition

Over the last decade, a transformation has been underway in the US public healthcare sector, as the Centers for Medicare and Medicaid Services works to shape a system that incentivizes value over volume. This has major implications for the way both healthcare providers and insurance programs operate.

This move to value has certainly been the case for Medicaid programs throughout the country, which serve tens of millions of enrolled

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KEN ROMANSKI
President
CMA

members and spend hundreds of billions of dollars each year. States have been steadily moving away from traditional fee-for-service payment models (based on the volume of care provided) towards advanced value-based models, which reward providers for delivering care that improves the quality of outcomes, while reducing overall costs.

This new focus will progressively require advanced data-driven strategies that enable health and social care providers to proactively detect and address an array of behavioral, social, economic, and housing conditions, to prevent otherwise avoidable illness and suffering.

Reaching the Limits of Row-Based Data Architecture

These broader strategic shifts have brought substantial changes to the way organizations work with information, and dramatically increased the volume and variety of data it analyzes.

Jason Helgerson, a nationally recognized leader in health care and delivery system reform, comments, “This new era of transparency and financial accountability called for an advanced set of data and analytic capabilities that facilitated the secure movement, sharing, and analysis of massive amounts of trusted data, at lightning speed, and CMA, a leading

At a Glance

- **Industry**
Healthcare
 - **Location**
United States
 - **Challenge**
Responsive analytics involving enormous volumes of data were required to manage a complex healthcare reform initiative.
 - **Products and Services**
Vertica Analytics Platform
Mosaic DART
 - **Success Highlights**
- + **Citizen-based:**
 - Improved quality of care as delivery and financing transitioned to value-based arrangements
 - Major financial impact, saving over \$18 billion
 - + **Technology-based:**
 - Accelerated analytic computations by 75%
 - Reduced database platform hardware cost by a factor of 10
 - Reduced to seconds a query against 14-billion-row-fact table → 80% faster than before

Medicaid information technology partner, delivered on this new paradigm.”

For one CMA client in this space, the state’s data and analytics environment had more than tripled over 10 years: The primary fact table—originally sized to support five billion rows of data—had expanded to more than 15 billion rows. At the same time, the number of Medicaid analytics users had also tripled, as appetites for analytical insights grew.

As a result, this client’s traditional Oracle row-based database architecture started to encounter difficulties scaling to the level of demand required, which put it at risk of failing to meet essential service level commitments around performance. CMA initially considered expanding and enhancing its existing data-warehouse platform, but soon concluded that the cost of doing so would be prohibitive. It needed another way to meet rising demands for capacity and query performance, one that didn’t break the bank.

Calling in a Best-in-Class Technology Partner

CMA evaluated a number of database technologies, and subsequently conducted an extensive proof of concept, leading to the selection and use of the OpenText™ Vertica Analytics Platform for select, complex queries.

Helgerson continues, “The combination of Vertica and CMA enabled fact-based decision-making that was integral to the success of the state’s transformational objectives.”

Brian Dougherty, Chief Technology Officer at CMA explains: “Vertica offered several advantages over other analytical database platforms. The technology is very functionally complete and scales in a fluid way. Most importantly for this client, Vertica offered a compelling

price-performance ratio and the opportunity to evolve from a traditional row-store database to a column-compressed architecture.”

The use of a column-compressed column architecture in the Vertica Analytics Platform allows queries to be isolated on individual columns, significantly reducing the search space that the database must scan. This is especially valuable for the Medicaid organization, as it works with very large database tables (the biggest comprising 600 columns).

In addition, the Vertica Analytics Platform offers advanced optimizer technology, which can exploit the internal column set in a very efficient way, allowing users to rapidly identify the precise data they need and analyze that data in isolation.

“There are a lot of column-compressed stores on the market, but none of them have the maturity of Vertica’s optimizer technology,” says Dougherty. “This was a key reason we chose Vertica, as that optimization lends itself very nicely to isolating in smaller column sets on tables.”

Moving Data into Vertica at Top Speed

After careful evaluation, CMA chose to extend its core row-based data analytics environment with a series of OpenText™ data marts, optimized to deliver high load throughput, ultra-fast analytical query speed, and high concurrency for multi-user querying.

This decision meant that the organization also needed an efficient way to transform and migrate very large volumes of data from its primary row-based data warehouse to OpenText’s environment. Using the existing database’s utilities wasn’t an option, as they weren’t made to operate in this of kind of heterogeneous environment.

Fortunately, CMA had the solution: Mosaic DART, a high-performance data movement platform. Using this proprietary technology, CMA was able to automate the process of translating thousands of database objects from their native, row-based structures to OpenText-optimized data structures, eliminating potentially months of effort. Additionally, Mosaic DART enabled seamless integration of OpenText into the state’s existing data warehouse workflows, further reducing data migration cost, complexity, and risk.

Today, supported by Mosaic DART, CMA moves tens of terabytes of data into its Vertica Analytics Platform clusters every week, quickly and easily.

“Mosaic DART orchestrates the end-to-end process of extracting the data from our main data warehouse, transforming the data structure, and ingesting it into Vertica,” explains CMA’s President, Ken Romanski. “It couldn’t be easier: We simply open a screen, point, click, and Mosaic DART handles the rest. This allows our DBA resources to focus on other priorities.”

Analytics Gets a Major Boost

Vertica Analytics Platform and Mosaic DART have proved to be a dynamic duo for CMA, promoting the achievement of SLAs on critical, highly complex analytical queries. As a result, the state’s Medicaid program has been able to accelerate daily analysis workloads by close to 75%. Likewise, performing a full scan of the primary fact table—a task that previously took 25 minutes on average to complete—can now be done in less than a minute with Vertica.

CMA has also successfully scaled out the environment on multiple occasions, taking on more data and more concurrent users without missing a beat.

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BRIAN DOUGHERTY
Chief Technology Officer
CMA

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Unlocking New Cost Efficiencies

As OpenText offers strong compression and impressive optimizations, the platform requires less hardware and storage. And it costs less to license than comparable solutions, which enables CMA to scale the state's data analytics environment in a very cost-effective way. CMA estimates that Vertica Analytics Platform requires three times less physical hardware to support the same data volumes as its traditional row-based database.

Brian Dougherty offers a comparison: “We currently maintain an eight-node cluster to support our largest row-based database. There's about 100 TB of data, supported by an all-flash storage array. The same data in Vertica resides on 16 1U servers. When you compare the retail costs of those two hardware platforms, Vertica ends up being less expensive to own by a factor of 10.”

Faster, More Iterative Analysis for Improved Outcomes

Vertica Analytics Platform's column-compressed storage has significantly increased the speed and efficiency of complex queries. This provides a better environment for iterative analysis, and allows users to refine and re-run queries very quickly, so they can get the answers they need in less time and with less effort. It's also optimal for supporting multi-user concurrency, meaning that larger numbers of users can run queries on the platform simultaneously while still enjoying consistently high performance.

Dougherty elaborates: “Say, for example, we wanted to sum up all the diagnosis codes and dollar amounts of related claims, and group them by provider. Running a query like this would involve scanning around 14 billion records. In our highest-performing row-based database, it would take a few minutes to complete. In Vertica Analytics Platform, we can return the same query in 20 to 30 seconds—an improvement of more than 80%.”

Through this ability to run highly complex, iterative queries, the OpenText solution is helping states dig deeper into growing volumes of Medicaid data. This will allow states to embrace value-based payment models more fully—which has the potential to transform how healthcare is delivered, by holding providers more accountable for care quality, outcomes, and cost.

Romanski concludes: “The ability to analyze large volumes of data in greater depth with Vertica will be instrumental in helping us address the evolving needs of our clients. This will help our clients better manage their complex reform initiatives and optimize their use of precious public resources to facilitate improved healthcare outcomes among the state's most vulnerable citizens.”

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