DATASTAX

HealthCare Anytime

Datastax Provides HealthCare Anytime with a Strategic Competitive Advantage as They Improve Patients' Medical Care

Company
HealthCare Anytime

Company Background
HealthCare Anytime provides Web-based portal solutions that help healthcare organizations achieve meaningful use, optimized operations, and increased patient and staff satisfaction. The company, founded in 2000, operates on a software-as-a-service (SaaS) business model, handling all hosting, implementation, training, and support for its customers.

Headquarters
San Diego, Calif.

EXECUTIVE SUMMARY

For more than 20 years, much of the national debate on reforming health care has focused on reducing the spiraling cost of everything from drugs, fees and premiums to Medicare reimbursements and even beneficial new technologies. And with good reason: affordability not only affects the health and well being of individual citizens, it affects the financial health of the country as a whole. As the McKinsey Global Network stated in a recent report on the subject: "It is becoming clear that the historic rate of growth of U.S. health care expenditures is unsustainable and is a major contributor to the high national debt levels."

To date, progress in reducing costs has been modest. According to the independent Kaiser Family Foundation, in the 10 years prior to the passage of the Affordable Health Care Act of 2010, health care costs were increasing 8.7% per year on average. Costs rose an estimated 4% in 2012.

Escalating in tandem is the volume of data which health care providers must manage: patient histories and treatment regimens, aggregated feedback from patient satisfaction surveys, billing information, compliance records—the list goes on. Terrell Deppe, Chief Technology Officer for the health portal company, Healthcare Anytime, describes the influx of data into his company as an "avalanche."

"That is the problem we face in healthcare," he continued, "finding ways to deal with an avalanche of semi-structured and unstructured data."

It is a common refrain among businesses—how to access, distribute, and utilize this vast amount of "unstructured" data, which has overwhelmed relational databases' ability to manage it. For healthcare providers, the implications can be lower patient satisfaction, higher mortality and morbidity rates, and out-of-control medical costs. For other sectors, it can result in missed sales opportunities, frustrated customers, and lost revenue.

The way out, technology watchers are saying, is big data. As David Shawitz observed in a 2012 *Forbes* article: "As we approach the 2020s, the trend toward big data, tools, and systemization of care will revolutionize the way hospitals and physicians work and, most importantly, the way patients are treated."

In early 2012, HealthCare Anytime found itself in need of just such a revolution. The San Diego-based company provides Web-based portal solutions that assist healthcare organizations in achieving meaningful use, optimized operations, and increased patient and staff satisfaction. The 13-year-old company employs a software-as-a-service (SaaS) model, providing hosting, implementation, training, and ongoing support for its customers.

Since 2010, HealthCare Anytime's data has increased exponentially. In 2011, the influx of patient data rose by as much as 50,000 records in one day; in 2012, volumes rose to as much as 150,000 per day. By the end of 2013, the company could see several million new records per day. Deppe and his team wanted to stay ahead of the avalanche, and not get buried by it. "The old ways of relying on systems of relational databases and database management systems weren't working," Deppe said.

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>
> *David Shawitz*
> *Forbes Magazine*

To cope with the influx, the company was trying various systems of indexing and archiving as free-text documents, but when one company began adding 20,000 patients per hour, a tipping point was reached that propelled the company to action. "Some of the data lost context," Deppe recalled. "The bottleneck convinced us that we have a big data problem, not a big storage problem."

This was enough to send HealthCare Anytime searching for solutions. "We wanted to be able to deal with the avalanche of data for what we need to know now, and still be prepared for the future," Deppe said.

The company embraced the DataStax Enterprise platform. DataStax Enterprise combines the performance of Cassandra with analytics powered by Apache Hadoop and enterprise search with Apache Solr, creating a smartly integrated, big data platform. With DataStax Enterprise, real-time analytic and search workloads never conflict, delivering maximum performance on a single database.

As a direct result of the investment, HealthCare Anytime is saving an average of $150K annually on database administrator costs alone. The number of DBAs needed to manage the system has decreased while database size has exploded. But more importantly, HealthCare Anytime has a system that can take it into the future, whether that future arrives in terabytes, petabytes, or exabytes.

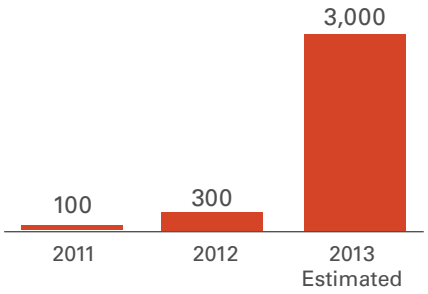
THE CHALLENGE

By early 2012, HealthCare Anytime realized it had a growing data management problem on its hands. "Patient search records can be quite large and extremely complex," explained Deppe, HealthCare Anytime's CTO. "We had identified a bottleneck when we began adding more than 20,000 new patients per hour. The database was clearly the limiting factor."

Even the threat of a bottleneck was unsustainable for the company, which was projecting growth to climb into the millions of records by the end of 2013, as shown in Figure 1.

The company also began noting performance issues such as sluggish searches, faulty searches, and difficult-to-read forms. "We found instances in which the system became completely unusable for certain people," Deppe said. "We have a doctor who is associated with a patient population of more than 150,000 individuals spanning several decades. Getting meaningful results from all that data simply wasn't possible. That's what really pushed us toward a big data model and into looking for a new solution."

Figure 1: Real and Projected Growth in Patient Records



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Chief Technology Officer
HealthCare Anytime

HIGHLIGHTS

Key Benefits

HealthCare Anytime's investment in a hosted, cloud-based DataStax Enterprise solution is projected to generate a 398% return on investment (ROI) in the first five years. Additionally, HealthCare Anytime will break even on the investment within the first year and achieve net benefits of $600K over five years. Key financial and operational benefits include:

Cost Savings

- *Optimizing the need to continually add staff to manage databases resulted in IT and support cost avoidance of $750K over five years*
- *On track to achieve 398% ROI over five years*
- *Gained ability to scale without needing to purchase new boxes and equipment*

Performance

- *100 times faster search and performance capabilities. Eliminated bottlenecks associated with previous system*
- *89% boost in data upload time; 87% increase in data access time*
- *Cut per-patient-record search time from 10–20 seconds to 1–2 seconds*
- *Conferred a competitive advantage by enabling services that other providers can't match*

Convenience

- *Gave patients more options and easier access to their personal information*
- *Simplified database management, enabling Healthcare Anytime to allocate its DBAs more effectively*
- *Improved monitoring and quality of data, despite massive growth in volume*

Deppe led the initiative to move from an in-house relational database to a single, cloud-based enterprise solution from DataStax. "We wanted the benefits of a structured database and the flexibility of a flat file or document management system," he said. "But we did not want to be short-sighted. We wanted to be able to deal with the influx of data for what we need to do now and still be prepared for the future. DataStax Enterprise was the only solution we found that did all that."

THE APPROACH

If HealthCare Anytime needed to shift to a big data model, it wanted that model to sync with its long-standing approach to its IT infrastructure. "Our approach is very standards-based," Deppe said, "which is to say that it relies heavily on cloud computing services, open source technologies, Linux and Java."

While the model was sound, building it on a relational database wasn't. "When we started looking at our reporting and data mining requirements, it became evident that a traditional relational model was not going to be able to get through all the data we needed to get through," Deppe said. Only one solution met all of HealthCare Anytime's criteria: DataStax Enterprise. The platform provides the following benefits:

Cost Savings

- Reduces outlays for maintenance, support, and in-house administration, including retaining a staff of DBAs to manage the system
- Saves energy and floor space at HealthCare Anytime headquarters
- Lowers capital expenditures on databases and other hardware

Performance

- Gives each patient a personal portal that is accessible anywhere in the world at the patient's convenience
- Speeds data load time
- Easily consumes fast incoming data with Apache Cassandra
- Analyzes and searches all data in single, integrated database clusters

Convenience

- Provides unlimited, cost-effective scalability
- Integrate seamlessly with various electronic health records and health information systems vendors
- Provides a hosted, cloud-based solution on a single database that can deal with virtually unlimited amounts of unstructured and structured data

THE SOLUTION

DataStax Enterprise is a complete big data platform, built on Apache Cassandra, that is architected to manage real-time, analytic, and enterprise search data in the same database cluster. To manage the massive amount of data, HealthCare Anytime opted for a single six-node cluster hosted by DataStax in the cloud.

"I'd been looking for a 'holy grail' solution to fit our big data needs, and full text searching appeared to be the missing link," he said. "Large database vendors were not able to provide us with cost-effective solutions. When DataStax came out with support for Solr in DataStax Enterprise, we felt we had found the solution we were looking for."

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The solution offers HealthCare Anytime the following capabilities and features:

- **Certified Cassandra** for real-time production applications
- **Built-in, continuously available Hadoop** for analytic workloads, including Hadoop MapReduce, Hive, Pig, and job/task tracking capabilities
- **Scalable enterprise search with Solr**, including full-text search, hit highlighting, faceted search, rich document (PDF, Microsoft Word, etc.) handling, and geospatial search
- **Full workload management with no ETL**, so that real-time, analytic, and search workloads do not compete with each other for either computing or data resources

Furthermore, the implementation was operational within a few days "We had an April 2012 commitment and it was operational as planned," Deppe said.

RESULTS

An independent study conducted by Mainstay found that HealthCare Anytime will realize a range of financial and operational benefits as a direct result of investing in the DataStax Enterprise platform. According to the study, HealthCare Anytime's investment in DataStax has significantly reduced technical and support costs associated with storing, indexing, archiving, and interpreting its massive data trove.

Specifically, HealthCare Anytime's investment in DataStax will yield a 398% ROI in the first five years, with positive net benefits within the first year and net benefits totaling $600K over five years. The study documented the following benefits:

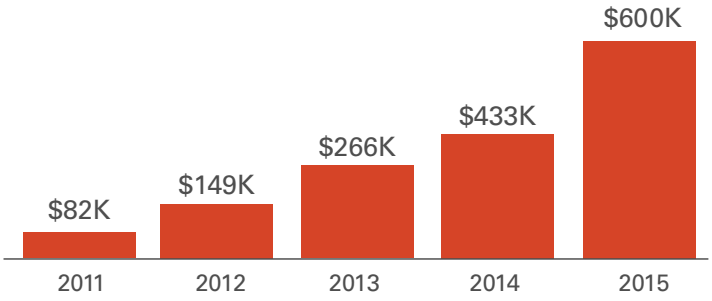
Cost Savings

- Optimizing the need to continually add staff to manage databases resulted in IT and support cost avoidance of $750K over five years
- On track to achieve 398% ROI over five years
- Gained ability to scale without needing to purchase new boxes and equipment

Performance

- 100 times faster search and performance capabilities. Eliminated bottlenecks associated with previous system
- 89% boost in data upload time; 87% increase in data access time
- Cut per-patient-record search time from 10 to 20 seconds to one or two
- Conferred a competitive advantage by enabling services that other providers can't match

Figure 2: Cumulative Net Benefits

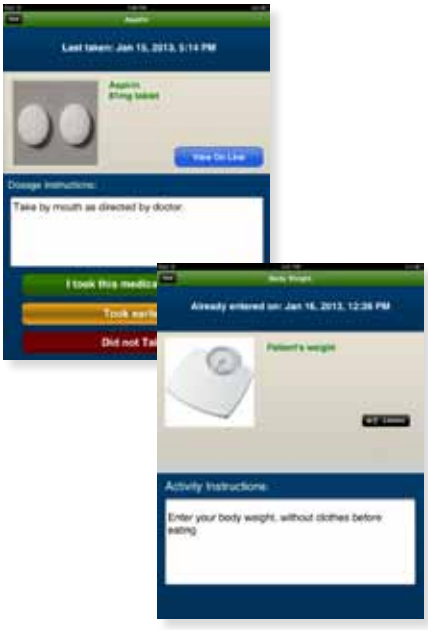


Convenience

- Gave patients more options and easier access to their personal portals
- Simplified database management, enabling Healthcare Anytime to allocate its DBAs more effectively
- Improved monitoring and quality of data, despite massive growth in volume

Factors contributing to benefits calculation include:

- Reduced outlays for maintenance, support, and in-house administration, including retaining a staff of DBAs to manage the system
- Lower capital expenditures on databases and other hardware
- Faster data load time
- Saves energy and frees up space



Huge Savings on Developer Resources

According to the Mainstay study, HealthCare Anytime will save $750,000 over five years on IT administration and other related support costs. Furthermore, with growth projected to increase by 3000% in 2013, the company would have needed even more DBAs. "Due to the ease of management, we have not only freed up staff, we can do more with the same size development team," Deppe said. "We reduced our labor effort without sacrificing quality."

Faster, Better Data Management

HealthCare Anytime has seen exceptional gains in its ability to handle its soaring volume of data with DataStax Enterprise. Every process is faster: search time, uptime, uploading time, response time. Search and performance capabilities are 100 times faster. Data access time is 89% faster; upload time is 87% faster (Figure 3). Patient records can be accessed in one to two seconds, down from an average of 10 to 20 seconds on the legacy database (Figure 4).

Figure 3: Data Upload Time (in seconds)

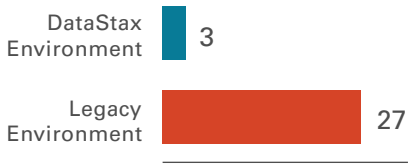
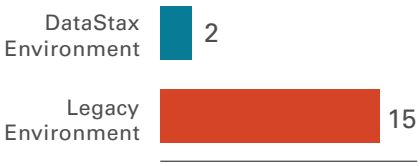


Figure 4: Data Access Time (in seconds)



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BIGGER AND SIMPLER AT THE SAME TIME

Unlike in the past, there is no outer limit to how much data HealthCare Anytime can store or archive—limitations on data apply to bandwidth only. Everything is saved and secured in repositories and can be pulled up at any time, a capability that is particularly attractive to Deppe. "DataStax enables us to throw nothing away," he said.

The platform has a built-in simplicity that is serving the company well. "The solution is really quite elegant—siphon off only the data you know you care about and store it in the simplest possible structure so you can get to it quickly," Deppe explained. "Then throw everything else into long-term archival storage where you can find it if you need more information. When that time comes, start processing the new files for the additional information and begin reprocessing the old files."

Furthermore, patients and providers have easy, user-friendly portals that are accessible anytime, anywhere. "We can bring up instances all over the world and provide patients with access to their medical records from their home or a private setting of their choice. Best of all, it's in a human-readable form, with human-readable values presented to the patient."

Greater Adaptability and Flexibility

Among healthcare technology providers, adaptability is a make-or-break capability. "Basically, we need to be able to mine data on the fly," Deppe said. "Healthcare providers depend on us to do that so they can get reimbursed by Medicare and Medicaid."

The same goes for flexibility. The data pouring in is not only complex, it ranges from structured to unstructured—a scenario that wasn't working well in the relational database environment. "The structure of healthcare data is very loose," Deppe said. "Data types are constrained by standardized schemas, but aren't always required for a document to be valid. This is necessary because episodes vary from patient to patient and case to case. There is no one-size-fits-all document for recording your life or your health."

Competitive Edge

All this adds up to a healthy competitive advantage for HealthCare Anytime: the company's platform can adapt to its customers, not vice versa.

"Our solution is hosted in a cloud environment and is agnostic in the way it integrates with various electronic health record (EHR) and healthcare information system (HIS) vendors," Deppe said. "That makes us pretty unique—we are like the Switzerland of healthcare. Hospitals, clinics and physician practices enjoy the benefits of patient engagement without being locked into a particular EMR/HIS vendor."

LOOKING AHEAD

As the Mainstay study found, HealthCare Anytime will reap more than $600K in financial and operational benefits over 5 years as a direct result of its DataStax Enterprise investment. This represents an ROI of 398% over five years. Figure 5 shows the breakdown of total costs and benefits by category. Deppe elaborates on how HealthCare Anytime will approach their database needs moving forward.

"Just because we have our new shiny DataStax hammer in our toolbox, doesn't mean that everything becomes a nail. We still have relational databases in our environment, and we are going to continue using them where they are appropriate. But DataStax definitely solves a problem that relational databases simply cannot do."

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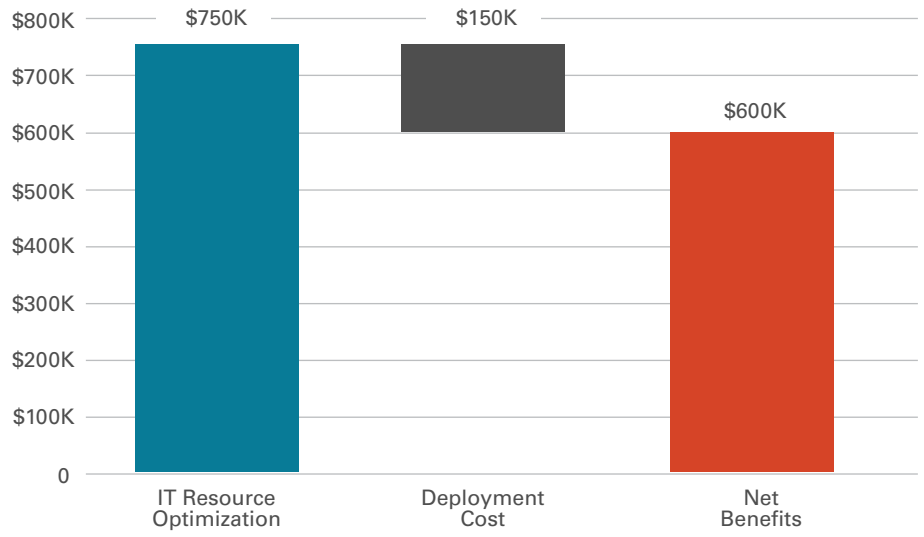
Scaling the big data divide has become a big driver for the company, delivering unparalleled levels of agility, scalability, and flexibility. Indeed, Deppe sees adaptability as the way forward for healthcare technology companies: in essence, the company that can go with the data flow will outlast the competition.

"Just like our customers, we appreciate elite performance, great customer services, and not being constrained by vendor lock-in," Deppe added. "In all these ways, DataStax delivers."

Figure 5: Total Costs and Benefits by Category



DataStax Enterprise (DSE) 3.0 Delivers Advanced Security Features

DataStax introduced DSE 3.0, the newest version of its big data platform, which offers the most comprehensive security feature set of any NoSQL solution. DSE 3.0 combines the scalability and performance of NoSQL databases with the security features required for mainstream adoption.

"DSE 3.0 lets us easily manage our big data needs and gain important insights that help us serve our customers, and ultimately patients, more effectively," said Deppe. "We are committed to protecting patient health information, and DSE's new security features greatly enhance the strength of our solutions. These features have arrived at just the right time for us because the volume and velocity of our data is bigger than ever."

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ABOUT DATASTAX

DataStax powers the big data apps that transform business for more than 200 customers, including startups and 20 of the Fortune 100. DataStax delivers a massively scalable, flexible and continuously available big data platform built on Apache Cassandra™. DataStax integrates enterprise-ready Cassandra, Apache Hadoop™ for analytics and Apache Solr™ for search across multi-datacenters and in the cloud.

Companies such as Adobe, HealthCare Anytime, eBay and Netflix rely on DataStax to transform their businesses. Based in San Mateo, Calif., DataStax is backed by industry-leading investors: Lightspeed Venture Partners, Crosslink Capital and Meritech Capital Partners. For more information, visit DataStax or follow us @DataStax.

ABOUT THIS ROI AND BUSINESS BENEFITS ASSESSMENT

Research and analysis for this business impact study was conducted by Mainstay LLC, an independent consulting firm and was based on interviews with Healthcare Anytime staff and reviews of industry literature. ROI calculations use industry-standard assumptions regarding the time value of money.

Mainstay is the leading provider of independent value assessment and IT strategy services. For more information, please visit www.mainstaypartners.net.

Information contained in this business impact study has been obtained from sources considered reliable but is not warranted by Mainstay.

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