

CASE STUDY

5 minute read

Healthcare Industry



Data Center Migration

# Sentara Continues IT Transformation with New Data Center and Predictive Analytics for Improved Patient Care



There are no pretty pictures of mountains or flowers on the screen savers of the monitors at the nurse stations at Sentara Healthcare hospitals. Instead, the screens show a color-coded status—red, green, or yellow—of the patients in each of the hospital’s private rooms. The colors are generated by a predictive analytics application in Sentara’s IT system that constantly interrogates the patient’s database, including lab results, oxygen levels, vital signs and more.

By themselves, each reading may not indicate a problem. But when correlated together the system can predict that the patient’s condition is likely deteriorating. When the nurses see red, they know to check on the patient ASAP and avoid a potentially deadly outcome.

The color-coded screen saver for patient alerts is just one of many healthcare information technology (IT) innovations to come from Sentara Healthcare, based in Norfolk, Virginia, an integrated not-for-profit system that includes over 100 sites of care and 12 acute care hospitals. Sentara has been a pioneer in healthcare IT ever since 2004 when it was the first to launch an Electronic Medical Record (EMR) initiative long before it became a national requirement. In 2014, Sentara was named one of the American Hospital Association's "Most Wired" hospital systems in Virginia.

## Creating a data-driven culture by design

Most recently, Sentara's IT leadership has focused on data driven initiatives that introduce predictive analytics into the mix of retrospective clinical data—such as lab reports that document a past event—and dynamic data, such as drug interaction alerts at the bedside that allow clinicians to make changes before an adverse event occurs. Predictive data correlates information sources that may not otherwise be combined to give clinicians new ways to predict adverse patient events.

One example of predictive analytics is Sentara's "sepsis crawler," which crawls the patient EMR database looking for data that meets criteria that a patient could possibly go into septic shock, a deadly condition. The system sends out an alert to caregivers to immediately evaluate those patients susceptible to sepsis and provide preventative life-saving care faster.

"We've learned that the discipline of healthcare is a data driven event beyond the EMR with predictive analytics at the forefront for transforming patient care," says Bert Reese, CIO of Sentara Healthcare. "To treat patients most effectively, clinicians need to quickly access all of the possible data points to help them better determine what action to take for earlier interventions and improved patient outcomes. It's the speed of analytics that will make healthcare more successful."

*"Our vision for this project was much bigger than just a data center move. It was part of an overall IT transformation."*

Jerry Kevorkian,  
CTO, Sentara Healthcare

## The right move at the right time

Sentara's management began an exhaustive evaluation of its existing 22-year-old data center in order to build on its leadership role in data analytics and prepare for future technology transitions.

They found that it was lacking in terms of expansion space, environmental infrastructure, and system capacities. Worse, these infrastructure limitations and lack of computing capacity were slowing Sentara's progress in introducing new knowledge-based services

and applications to its hospital network. A move to a new data center was determined to be the best way to build an infrastructure to support Sentara's current and future IT innovations.

Sentara's existing data center had a modest start in the former laundry room of one of the system's larger hospitals and was moved to a leased space 22 years ago to make room for upgraded mainframe equipment.

Over the years, because of multiple hospital acquisitions and the digitizing of many clinical processes, Sentara outgrew that space despite having performed a major, costly upgrade to add more power and install new generators.

However, because of the aging infrastructure the generators were not able to take on heavy loads without one of them being taxed. During a hurricane one of the generators went down, and although the hospital network stayed up, the data center was quickly running out of power. Before the street power came back on, Sentara's IT staff was just minutes away from having to shut down some critical clinical systems just to keep others live.

"This was a very risky situation that confirmed our decision to move to a new data center," says Jerry Kevorkian, chief technology officer at Sentara.

"Also, the data center was on a flood plain and we had had several close calls. It was clear that this data center was very inefficient and no longer the right fit for us environmentally. The electrical, AC, and floor space were all running out at the same time."

Kevorkian brought in consultants to help cost out the building of a new data center. Planning the move and getting approval took nearly four years, but Sentara was able to launch a multi-phase project to retrofit the ground floor of an older, vacant hospital building that was already housing IT staff on its upper floors.

"Our old data center was too expensive to repair, and we had just built a new hospital in another part of the city, leaving this one vacant," recalls Betsy B. Meadows, Director, Enterprise Network Services at Sentara. "All of those factors just came together, and we were able to make a good decision on a data center space where we could bring in all of the right environmental systems."

## Advanced planning pays off

Data migration is a huge challenge in any data center move, but an especially critical process for a healthcare organization that must ensure the integrity and security of patient data.

Sentara was challenged to move a data center environment that had grown from just three mainframe applications to well over 900 applications. Meadows initially found Transitional Data Services (TDS) in a Google search and contacted them directly as an independent vendor.

“We were very impressed with the processes and proven experience of TDS,” Meadows says. “TDS was just heads above everybody else from a systematic approach to the physical move process, and head and shoulder above others in terms of their tools and expertise.”

The TDS team brought their proprietary TransitionManager™ software tool to the project and provided Sentara’s IT team with an advanced alternative to using traditional manual methods to track data migration processes. The use of TransitionManager’s dashboard provided the Sentara team with deep visibility into all phases of the migration at multiple levels and gave everyone a step-by-step view of exactly what was happening at all times.

According to Meadows, successfully moving a data center requires a strong leader to coordinate and manage internal and external staff. At Sentara, Director, Enterprise Management Technologies, Jason Siegrist, became the de facto project manager.

“Jason was integral to this aspect of the project and the person who kept everyone on point. His technology and people skills made a very complex project look easy,” says Meadows.

“When we evaluated potential vendors, I wanted people who had deep technical skills, but were also familiar with healthcare,” says Siegrist.

“The fact that TDS had completed many complex projects like this before made it a lot easier to move forward with them as a partner. They were flexible too. While their tool is comprehensive, TDS worked with us to add new elements to address our specific security requirements.”

“TransitionManager was extremely beneficial to the success of the move,” Meadows adds. “It was a huge benefit to be able to tie all of the migration details together in one tool. The organization of the data, ease of use, and data views through the dashboard all gave us transparent insight into the move process.”



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Kevorkian and the IT team spent nearly 18 months just preparing for the move and testing different network scenarios to ensure the success of the comprehensive physical and virtual migration. Then they chose to make the transition to the new data center over nine months in nine separate weekend events—somewhat longer than a usual data center

migration project, but a timeframe that would have zero impact on the daily processes of the system’s hospitals and care centers.

For example, working with TDS, Sentara’s team did extensive planning and testing to determine how many virtual machines (an operating system or application environment that is installed on software which imitates dedicated hardware) they could move in an hour without incurring any system downtime.

“TDS did a great job and they were very responsive to our unique needs,” Meadows says. “They guided us very well through the process and were there continually for support and to make sure that we were successful in the implementation and execution of a very complicated task.”

## A smooth move without disrupting patient care

*“TransitionManager gave us transparent insight into the move in a single tool.”*

Betsy B. Meadows

Director, Enterprise Network Services, Sentara Healthcare

Sentara has zero tolerance for data center downtime, since clinicians are dependent on the electronic medical record to obtain data that can speed the provision of life-saving care.

The data center migration was executed and managed in a multi-phase process while adhering to the hospital’s zero tolerance for downtime.

Despite the complex moving of physical equipment, virtual machines and hundreds of applications, the performance or accessibility of clinical systems was never an issue.

“Our clinicians and staff didn’t even know the move was going on, even though we had told them that brief downtime might be a potential risk,” Kevorkian remembers.

“But everything ran so smoothly that most people were unaware that we even moved the data center. We did it without disrupting operations or patient care, and the hospital continued with ongoing mergers and other innovations. To us, that was the best measure of

success.”

Sentara’s data center move was a concentrated team effort that required tight collaboration among disparate groups, including:

- Kevorkian’s IT staff of networking and server teams
- Application owners
- Clinical staff
- Directors and corporate-level executives

The Sentara CIO further motivated the IT staff by making the data center goals 50% of their bonus. While TDS had the migration processes clearly defined and in place, Sentara’s IT management was tasked with getting all of the application owners on board for the move and helping them understand the process and their roles to make the move successful.

They spent hundreds of hours mapping out all the application touchpoints and ensuring that everyone involved understood the impact of the move. From an execution standpoint, Sentara’s IT staff also worked closely with TDS on preparing a project “runbook” from which they ran tests and made preparations for every phase of the move, a process made far easier using TransitionManager.

Because TransitionManager captures all move related information in a single database, any updates or changes to the plan appear automatically as runbooks are dynamically generated.

“The move was coordinated and driven by Kevorkian’s team, but the app owners were very engaged, and we couldn’t have done it without them,” Meadows says. “If someone were to call me for a reference if they were moving a data center, and ask about lessons learned, I would tell them that they really need to understand the commitment from their infrastructure and app staff to get the job done correctly. It’s a huge commitment.”

“It was a spectacular move, especially considering it was not IT’s only point of focus for the whole company, which is the way it should be,” CIO Reese says.

“If the hospitals had to worry about moving the data center, then they would have had to take their eye off the bedside or exam room, and they cannot do that. Jerry and his team are very disciplined and did what they needed to do to make it a success. TDS fit their style just perfectly.”

## Efficiency improvements to drive next generation IT

According to Meadows, Sentara's new data center is much more resilient from an environmental perspective, is more robust and less prone to failures.


"With 50% more space capacity, we now have room to grow and we will continue to virtualize everything we can," Meadows says. "Overall, we in IT can all sleep better at night knowing that we have a much more resilient infrastructure in a location not prone to flooding."

Sentara's new data center has yielded significant efficiency improvements over the old site. According to Kevorkian, the Power Usage Effectiveness (PUE) in the new data center shows a doubling of efficiency compared to the old data center.

One example of efficiency improvement in the new data center is the use of outside air cooling, which delivers energy saving benefits over using traditional air conditioning by pulling in cool air from outdoors when outside temperatures are below 50 degrees.

Sentara also standardized on a virtual software platform that can expand as technology and systems continue to evolve and change. In planning for the future, Kevorkian's team looked five years out when purchasing equipment such as server racks in anticipation of supporting new applications.

Finally, "We did not just simply move old equipment; we selectively upgraded to faster, more powerful hardware to improve compute capacity with high density servers," Kevorkian says. "These upgrades could not have been possible in the old facility, because there was no floor space to do it. So we were able to move data from a slower box to a faster box and we're certainly seeing benefits from that."



**"OUR VISION FOR THIS PROJECT WAS MUCH BIGGER THAN JUST A DATA CENTER MOVE... IT WAS PART OF AN OVERALL TRANSFORMATION AT SENTARA TO CONTINUALLY IMPROVE THE WAY WE DELIVER HEALTHCARE**

**Jerry Kevorkian,  
CTO, Sentara Healthcare**

## A future of growth and innovation

Sentara has continued to grow by mergers and acquisitions, as well as by clinical innovations, without disruption throughout the multi-phase data center move—and the organization has no plans to slow down.

“Our vision for this project was much bigger than just a data center move, and more than just about mainframes and servers,” Kevorkian says. “It was part of an overall transformation at Sentara to continually improve the way we deliver healthcare.”

For example, Sentara’s use of wireless IT technology is set to expand with more innovative devices at the patient’s bedside and in the home via telemedicine monitoring and alerting systems. The organization is already using predictive analytics in its emergency rooms to help reduce the rate of readmissions and quell the spread of contagious disease. During the H1N1 flu outbreak, Sentara’s systems performed patient correlations to determine if ER patients had any indications of precursors to the flu.

If so, the hospital could isolate them faster, as well as track probable flu occurrences and move additional clinical resources to Sentara hospitals in affected areas. Sentara’s new data center infrastructure will also position the company to extend its cloud services for patient-related applications to additional facilities throughout the network. Currently, the company’s Life Care Center nursing homes use a cloud-based application that is integrated with their business processes.

“With our new data center infrastructure, Sentara is ready for the next generation of healthcare IT driven by data analytics,” Kevorkian says. “Now, beyond real-time alerts we can quickly anticipate what actions to take to prevent a patient crisis. Using predictive analytics, we have a better way to build new protocols of care and new treatments.”

And from an IT perspective, Sentara will also continue to look to TDS as a partner in data center services.

“TDS had the best tools and the best value for dollar,” Reese says. “They flexed their schedule as needed to accommodate our nine-month plan, and in the end made the move go smoother so that Sentara could gain improvements faster. Sentara’s IT team also performed with excellence and there is a lot of mutual respect between the two teams. It was a great move and a great partnership with TDS.” •



## About Sentara Healthcare

For more than 125 years, Sentara Healthcare has grown as an integrated healthcare system throughout Virginia, North Carolina, and beyond. Sentara has one of only a few Level 1 trauma centers in Virginia and operates more than 100 sites of care, including 12 acute hospitals—seven in Hampton Roads (Southeastern Virginia), one in Northern Virginia, two in the Blue Ridge region of Virginia, one in southern Virginia and one in North Carolina. [www.sentara.com](http://www.sentara.com)

## About TransitionManager

TransitionManager is a web-based collaboration tool that greatly simplifies and streamlines the end-to-end process for complex IT and data Center transformation initiatives.

TransitionManager includes a cross silo asset inventory (physical and virtual), the ability to visualize complex relationships / dependencies (application, infrastructure and compliance), templated workflows with real-time execution, and full command and communication center to assure smooth migrations.

TDS has been helping organizations plan for and manage complex change for over 18 years and we built the only software platform that is specifically designed to accelerate, simplify, and orchestrate any IT transformation process – and eliminate risk in execution. Contact us today to discuss how we can help your organization prepare and recovery quickly from whatever comes next.

Transitional Data Services • 1700 West Park Drive • Suite 350 Westborough, MA 01581  
Telephone: 508.625.3030 • Toll Free: 877.973.3377 • Fax: 508.861.0741 [www.tdsi.com](http://www.tdsi.com) • [info@tdsi.com](mailto:info@tdsi.com)