

CASE STUDY:

For TGen, Responsive Patient Care Means Leveraging Advanced Container Technology

Portworx Enables Critical Workflows to be Transported and Repeated In Healthcare Units Throughout TGen — Driving Numerous Benefits



Problem

Management of rapidly growing data stores deflected TGen's attention from more urgent focus on ensuring consistency and repeatability in patient care

Solution

Deploy container technology; adopt Portworx to containerize data and make it portable across specialty healthcare units

Progress

With Portworx deployed, TGen staff is developing regimens to 1) use data to create repeatable treatment experiences, 2) ensure easy, quick retrieval of data stored up to 25 years ago, and 3) increase scalability while reducing storage costs by 50% or more

James Lowey, CIO of the Translational Genomics Research Institute (TGen), joined the organization in 2003. A vision of 50 leaders in science, medicine, government and business, TGen has assumed the expansive role of translating discoveries in genomes into patient treatments—not eventually, but rapidly. “In the research community, people often focus on the next grant, on publishing papers, and on discovery without necessarily having a total focus on treating patients,” said Lowey. “But we are very patient-centric, patient-driven.”

What is Lowey's role in bridging this gap? His mission is to build high-performance computing environments. And he says that new ways of handling masses of newly created data – often measured in petabytes per day in healthcare environments – are critical to bridging the gap between discovery and patient care.

And, in his own pursuit of technologies to make life easier in his data-intensive healthcare environment, he discovered containers—and Portworx.

Data Overload

“One challenge is the volume of data in motion,” Lowey said. “Genomics has compounded that challenge greatly. In sequencing a single patient, we can amass up to six terabytes of data. And we often sequence a patient twice, for example to determine the differences between their bloodline DNA and tumor DNA. Now imagine repeating that process for over a thousand patients.”

Additional data is required to meet compliance and regulatory requirements. “Data from clinical samples must be archived for at least 7 years, and as long as 25.” What’s more, he says, that data must be encrypted throughout its entire lifecycle, a requirement that was reinforced most recently by the federal government’s Precision Medicine Initiative.

“This is not patient records I’m talking about. The entire industry has been managing those for years. We’ve been generating full-on genomic data at scale only since about 2008. The cookbook is not written. We’re writing it.”

Why Containers?

Lowey began experimentation with containers in 2015, when the technology was emerging. “It took a fortunate introduction to Portworx to understand the benefits of containers. It’s about portability of data – which is Portworx’ specialty – not just portability of applications. While dealing with the storage challenge, we’re dealing with a workflow challenge. How can we repeat patient care workflows and experiences across departments within the organization?”

That grand vision is less daunting today, he says. TGen now envisions a world where it can package entire genomics workflows within containers and use Portworx as a storage medium. “In doing so, we will be able to shift that package anywhere and run it anywhere.”

And what is his ulterior motive? “Using containers, under the ‘management’ of Portworx, allows other units that may not have informatics staff the ability to run some workloads on their own infrastructure and validate results, without having to maintain huge amounts of IT knowledge.”

Sharing Workflows

In the bigger picture, he says, “I envision that Portworx will enable us to create validated workflows that are portable. What I mean by that is a workflow that we can validate in a CAP/CLIA-type¹ environment and transport to another CAP/CLIA-type environment without having to revalidate the whole thing.”



James Lowey
Chief Information Officer
TGen

¹ CAP (College of American Pathologists) and CLIA (Clinical Laboratory Improvement Act) are accreditation programs of the College of American Pathologists.

“What happens when, for whatever reason, someone submits an insurance claim relating to a disease, and you have to go back through data that is 25 years old to answer the claim?” he asks. “I can see the ability to package this data in a single place that’s immutable and can be carried forward indefinitely. We’ve been thinking about this for a long time and how we could accomplish it. Now I’m thinking that Portworx is the answer, and it helps us avoid all kinds of ugly roadblocks.”

“If we just run containers by themselves, there are benefits in regards to our systems architecture, and there are benefits if we want to do a rapid deployment across a variety of platforms. But we’d still be stuck with the problem of data movement and the data velocity behind it. That’s the problem Portworx solves.”

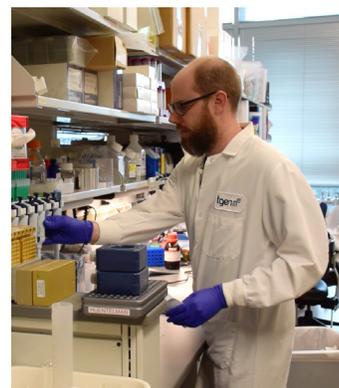
Lowey says that, when he first worked work with the Portworx sales team, he exclaimed, “This is what we need. We need something that takes all of our data and extracts it into a single ‘thing.’”

He added that container technology would provide yet another benefit. “I was thinking, ‘What if we’re now able to utilize our hardware much more efficiently?’ Today, we’ll have part of a pipeline that is consuming multiple nodes, and it’s solely because that’s how the code is written. It’s single-threaded, and it doesn’t play well with other ‘stuff.’ If you can take that and put it into a container and run four of those pipelines on a single compute node, instead of having most of that node sitting idle – doing nothing except turning electricity into heat – well, there’s our answer. We don’t need more heat. We’re good in Phoenix.”

Deploying Portworx

Lowey says the Portworx deployment process was “relatively simple.” “Because we’re pretty hardware-savvy, we were able to leverage our existing hardware and our expertise around containers, and really just had to learn the Portworx piece of it. Portworx engineers were outstanding in helping us get up and running; we did our first deployment in a matter of hours. We’ve deployed Portworx on blade servers, on micro blade servers, on standard pizza box servers, and on iSCSI servers. We’ve done multiple iterations and different configurations. I would say that anybody who can run containers can run Portworx easily.”

Today TGen uses what Lowey calls “existing legacy storage” for replication. “When we started working with containers, we thought of archiving data via containers. Most likely the way I would do this for long-term storage is to archive the entire Portworx environment within the containers. And then, if I ever needed to rehydrate it and rerun it, it would be pretty easy to do.” An added benefit of Portworx is that it ensures persistence of application data across nodes.



TGen Genomics Lab

TGen's primary mission beyond expediting patient care, is to find technologies that enable its researchers to do their job as efficiently and cost-effectively as possible. "Portworx is one of the first truly new technologies that I've seen that could be a true game changer for how we handle many of our workloads. As genomics is applied directly to patient care, we need technologies that will drive results."

And what about the performance of Portworx? "Today we can do the processing on Portworx in the same amount of time that we're doing it on our current, high-performance Lustre system."

Scaling is another concern—and another plus with Portworx, which scales to thousands of nodes. When you consider scale, says Lowey, you have to consider what is involved: the hardware, software, applications, locations, and even the communications links. "When I look at TCO, I have to consider the pure cost of storage in the genomics space, which, for us today, is about a thousand bucks a terabyte. I foresee utilizing Portworx and containers, as well as utilizing more commodity-type hardware, to reduce that by half, maybe more. That's what I see coming down the road."

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Learn More

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CS-TGEN-1-12-17