



When Lives Hang in the Balance, Put Your Trust in Hyperconverged Infrastructure

by Tiwan Nicholson

I often say we stand at the intersection of tragedy and hope. At United Network for Organ Sharing (UNOS), we bear a huge responsibility: to serve the organ donation and transplant community of the United States, to help everyone who needs an organ get an organ, and to put the right infrastructure and policies in place to ensure the allocation process is correct, efficient, and fair. To be the provider of technologies that help people extend and expand the quality of their life—there's nothing else like it.

I joined [UNOS](#) in 2018 and am now director of IT service operations, under the guidance of Alex Tulchinsky, our CTO. I'm not one of those IT people who enjoys technology for technology's sake, but I always loved puzzles. During my last semester in high school, I took a computer concepts class and was intrigued by how you could write a program to solve a problem. I got my computer science degree, and continue to be motivated by the ways technology can solve business problems.

Fast forward some 20 years to my arrival at UNOS. As Alex often says, the nature of the national transplant network means the technology that supports it needs to always be on to serve the patients who are depending on us. In addition, our organ matching system is very resource intensive. We have a large research and data science division, and of course that spells big compute, big data, and a big draw on resources to run workloads very fast.

The nature of a complicated and vital network means the technology that supports it needs to be always on. #NutanixStories

To give you a quick example, organ allocation matching algorithms are very complex. The algorithms match donated organs to patients waiting for a transplant. Kidneys are the most in-demand organ and they are also the most frequently available organ, since donors have two. The match algorithms for a kidney entails ordering a rostered list of maybe 75,000 people across the country to determine who is the best match according to organ allocation policies. For kidneys, there are 150 antigens that have to be matched to determine compatibility, and that is just a fraction of the things that must be considered to get the right organ to the right patient at the right time. Kidney matches are executed 50 to 100 times a day when donor kidneys become available, but it's more than just a transaction; each one of those

represents a potential life saved. And, each one is only possible thanks to the generosity of organ donors and their families. We are stewards of the gift of life.

A System That Doesn't Break a Sweat

Back in 2015, I implemented [Nutanix](#) as a VDI solution at a previous employer, and it didn't take long for me to realize [Nutanix](#) could revolutionize our entire data center. When I joined UNOS in 2018, it was perfect timing for such a project. We were going through a platform refresh and needed a high-performance, highly-scalable platform that would empower us to run in multiple operating environments with zero downtime. To me, it was a no brainer. [Nutanix](#) could handle our workloads with seamless, instant scaling that would be otherwise impossible.

We began to implement Nutanix in October of 2018. In accordance with our geographic diversity and cloud initiative, we have operating environments in Virginia and in Irving, Texas. Nutanix has been a big part of supporting the goal of being always on, with the ability to move those workloads across physical and cloud environments. UNet, our transplant technology platform, itself runs on Nutanix. We have a number of complex transactional applications, a SQL server plus other types of databases, big data analytics workloads, as well as our business intelligence systems all running on Nutanix now. We are two years into the process and continue to move much of our technology stack over to Nutanix.

Alex and I have some pretty well-tenured infrastructure and application professionals on our team, and they have been really impressed with the performance we get out of Nutanix. I've literally seen jaws drop at the speed Nutanix brings to applications that were traditionally very resource-intensive. We are seeing a 30% improvement on some very laborious, big data, deep analytics workloads. Nutanix shaved almost half the time from an analytics task that used to take numerous hours to complete.

We now have the confidence that we can run anything on HCI. Because my experience at workplaces prior to UNOS was with VDI, I've gone through "land and expand" before. But I've learned here that you can actually just go straight to expand. Now, I believe Nutanix can shoulder any load we throw at it. It doesn't even break a sweat on determining our best match from kidney rosters.

Better Visibility Means Faster Decision Making

From an operational perspective, Nutanix gives us the visibility to start driving tangible improvements. When you have a multi-tiered environment consisting of storage, compute, and networking, it's hard to aggregate and understand performance and functionality. Nutanix gives us that visibility. The administrative tools with [Prism](#) and [Prism](#) Pro are fantastic. To know when I needed to add more capacity based on our run rate, I used to have someone crunch those numbers and report those

forecasts. Now, Nutanix gives me those calculations proactively, helping me think ahead and budget accordingly.

Having all those metrics I need in one single pane of glass means we no longer need a team of specialists to manage all our disparate types of workloads. I don't ask a storage engineer or a network engineer or a virtualization engineer to pull those metrics; everyone can look at that same pane of glass to get the information they need. Now, team members can make faster decisions, and they have more time to do higher-value work.

Something Alex reminds us is that in our line of work, it's not always easy to translate boost in performance to ROI. How do we measure effectiveness in the national transplant network? One example we can look to is how we help transplant surgeons make more informed decisions.

We generate and provide a lot of analytics for the transplant professionals. An example is an ability for transplant surgeons to retrospectively review organs they turned down that other transplant hospitals accepted and transplanted. Surgeons review their previous decisions and use the information in future cases—whether to consider accepting high-risk organ, for example. We made improvements prior to Nutanix, but generating these types of analytics still used to take many hours. With Nutanix, the time has been reduced significantly.

With Nutanix-enabled solutions, transplant professions spend less time with data and more time with their patients. #NutanixStories

COVID-19 has wreaked havoc for everyone and created some unique challenges for the transplant community. Within our ecosystem, we saw many health professionals reassigned to respond to the urgencies of the pandemic. We too had to adapt and implement/test changes quickly in days or short weeks, when new requirements were needed to account for COVID-19. The processing power and agility of Nutanix was instrumental in our ability to rapidly deliver these changes.

Being Our Own Technology Disruptors

This is just the beginning. Next, we're looking at [Nutanix Calm](#) for orchestration and [Nutanix Flow](#) for micro-segmentation. We're not running VDI yet, but it's on our radar. And we're excited about the partnership Nutanix and Microsoft just announced: the public cloud offering with Azure.

It became clear to us several years ago that continuing to run entirely on-prem was not an option anymore because technology is moving away from that. Cloud gives you a lot of elasticity to scale on demand, but also the variety of tools and technical capabilities has grown much more in the cloud than

it has on-prem. We need to continue evolving with those technologies.

On the other hand, we are stewards over sensitive health information. We maintain the transplant history for every transplant performed since 1988. Our responsibility is to ensure the protection of that information. It's not to say that the cloud doesn't have its protections, but that I think UNOS will likely have some on-prem element because of the nature of our data and interactions with it.

It becomes about finding a balance between being on-prem and in the cloud. Nutanix gives us the best of both worlds. We have that cloud-like scalability, manageability, and flexibility on-prem, but we can convert to the cloud for workloads when necessary. We also want that combination of environments for disaster recovery and business continuity.

If you don't disrupt yourself, someone else will. #NutanixStories

In every industry, someone is always itching to be a disruptor. We're using disruptive technology to innovate, and Nutanix is a big part of that. We went from a multi-tiered to a hyperconverged environment, from a specialized to a generalized operational model, to blowing away our baselines. It's amazing to see how Nutanix has improved our environment and how it supports our work.

Coming to UNOS was like a dream come true. Nothing is more rewarding than contributing to an organization that saves and improves the lives of so many people. Unfortunately, we can't save the lives of the 100,000 people on our organ transplant waitlist with technology alone. Simply put, we need more organ donors and you can help by going to [UNOS.org](https://unos.org), learning about the organ transplant system, and registering to become an organ donor. Some of my colleagues are themselves the recipients of organ transplants, and they—and their donors—are an inspiration to us all.

United Network for Organ Sharing (UNOS) is a mission-driven non-profit serving as the nation's transplant system under contract with the federal government. We lead the network of transplant hospitals, organ procurement organizations, and thousands of volunteers from the organ donation and transplant community who collaborate to provide lifesaving transplants for patients in need. Dedicated to preserving the gift of life, we work together to improve the system by increasing the number of organs recovered and used, boosting the number of transplants performed, and ensuring patients across the nation have equitable access to lifesaving transplants. <https://unos.org>.