

Cloud Technologies Speeding Organ Transplant System

<https://connectedsocialmedia.com/19654/cloud-technologies-speeding-organ-transplant-system/>

The Tech Barometer Podcast

Alex Tulchinsky:

Our biggest challenge is that there are not enough donors. We just need more people to register and volunteer to be organ donors, because there are over a hundred thousand people who are still waiting on a life-saving transplant.

Jason Lopez:

If your child or family member were in organ failure and needed an organ transplant, how would you get it? The first place to turn would be a family member for organs like kidneys or a liver. Those can come from living donors, but if they needed a heart, for instance, that has to come from a deceased person. It's not an easy process to match those organs to patients who need them. This is the Tech Barometer Podcast, I'm Jason Lopez. Donated organs are managed nationally by the United Network for Organ Sharing, known as UNOS. Their system for keeping a database of available organs and matching those up with a transplant patient has a fascinating IT story behind it.

Alex Tulchinsky:

Over the last four and a half years we've been able to reduce the wait list by 20,000 candidates.

Jason Lopez:

Alex Tulchinsky is the Chief Technology Officer at UNOS, where his mission is to manage the many technologies the organization deploys to run the National Organ Donation and Transplant system.

Alex Tulchinsky:

There are still over a hundred thousand people waiting and we have to do something. We continue to work with all of those constituents to continue to further reduce the waiting list. And in parallel, the number of transplants a year have increased. We used to be at 28,000, now it's almost 40,000. It's really great that the progress has been made, as I've shared with you, but the need of those hundred thousand people that are still waiting and more that are going to be added is what drives us to solve these challenges.

Jason Lopez:

Getting enough donors is the overall challenge, but behind the scenes, there's the tech challenge. This is not a case of a hundred thousand data entries that a typical PC can handle. Time sensitivity is high and the factors are many: the medical status of the donor, the size of the organ, the waiting time of patients, the compatibility of the organ to the patient's body. Then there's the window of time that organs can be stored, the distance the organ must be

transported, and the survival benefit, the UNOS system links 57 organ procurement organizations, 250 transplant hospitals, 150 tissue compatibility labs, as well as critical medical data, health records and policies.

Tiwan Nicholson:

The transplant community comes together and develops policies to ensure the fair and equitable allocation of organs regardless of where you live or your race or your financial situations.

Jason Lopez:

Tiwan Nicholson is the Director of IT Operations at UNOS.

Tiwan Nicholson:

Those policies are continually evolving. We take those policies and we convert them to algorithms and business rules. And then we run those on-demand in our system, which produces an ordered list of candidates for each organ that is donated. So if a kidney is donated, we then run those rules based on policy, and it provides an ordered list based on the sickest patients who would be qualified to receive that organ. The running of the match runs on demand at the moment that an organ is donated, we then run the match and determine what the candidate list is going to be.

Jason Lopez:

Things weren't always this way. Go back more than 30 years ago, and you'll find that the system for matching was based on telephone conversations between doctors, OPOs and UNOS staff. and you'll find the system for matching was based on tape recordings made by those requesting organs. Matches were done by the doctors in the system who had listened to the tapes and pore over the medical data. Throughout the 1990s, UNOS applied methods and applications that that achieved high efficiency based on technologies available at that time. UNOS has continued to leverage technology advancements to push the system to the best it's ever been.

Alex Tulchinsky:

We have really begun our transformation as an organization about four or five years ago. What's happening in the community is that their data burden did not get reduced. It actually became increased. More data needed to be submitted. And so our focus from a technology perspective is building electronic bridges between hospitals, OPOs, histocompatibility labs and us. So that that information super highway could really be that information super highway and people actually can make decisions with that data.

Jason Lopez:

Medical technologies like x-rays in the 1890s, the first dialysis machine in the 1940s, the invention of the CT scanner in the '70s have saved many lives. What UNOS demonstrates is how enterprise software is having that kind of impact. Here's Alex Tulchinsky describing typical workloads.

Alex Tulchinsky:

One workload occurs when we run matches. When an organ becomes available, we have to create a rostered list that that Oregon might be available for in their list of patients in a waitlist, as we call it. As the organ allocation policies evolve, they at times become more complex and more inclusive of other data elements that have to be considered, but we've been able to improve performance of those match runs, as they call them, that are happening pretty much all day. So we've seen improvement, which enabled us not to negatively impact the performance of the overall system. And so more data, more complex rules, but the formats, as far as people who are looking at it, is the same. While behind the scenes, we're actually seeing the improvement of what Nutanix have brought to the table. That's one example of a workload.

Tiwan Nicholson:

Twenty fifteen we kind of started our cloud journey, taking advantage and leveraging some cloud based applications to perform certain critical functions within the whole transparent life cycle. We use Salesforce to maintain our membership database. We use Service Now as well to do some workflow based services for the community, but the core application is still in an on-premise or private cloud environment.

Alex Tulchinsky:

More recently with the submission of more data and with additional complexity, we needed to make sure that we can operate not just on-premises or in the public cloud. We needed to create a hybrid environment. And that hybrid environment is what's helping us to kind of keep services always on.

Jason Lopez:

One of the biggest IT challenges is having an always-on presence, while adding innovations. Tiwan Nicholson likens it to replacing the tires on a car while it's moving.

Tiwan Nicholson:

We're not able to say "all right, time out, everybody time out, you know, transplant hospitals. We're going to take U net offline for some extended period of time. So we can do this really neat innovation." We're just not able to do that.

Jason Lopez:

That's because lives are at stake. U-Net is the core system that handles the matching of organs to patients. Cloud technologies enabled UNOS to run matches and do big data and analytics faster than ever before.

Tiwan Nicholson:

For all of the benefits of cloud, to have to swivel chairs, as we refer to it, from one console managing cloud-based workloads to another console managing our on premise workloads is cumbersome. It can be confusing, it adds complexity to our processes and procedures. The ability to seamlessly manage workloads and literally have no concern as to where those workloads are running completely changes the game.

Alex Tulchinsky:

We've made improvements throughout the last four or five years. And so while we continue to make those improvements, we saw another kind of a step function that took us into yet another better performance, a boost, so that the recency of data for people to receive is better. For example, if something used to take three hours to run, it now takes half the time, or 30% faster time to generate something. So we can deliver information to people who are asking for it. They're now able to look at that data sooner than they would have before.

Tiwan Nicholson:

All the complexities that go into data storage, and compute, and scaling, and remaining flexible, and things like that have all just been distilled into the single pane of glass. Most administrative tasks can be performed with one or just a few clicks. And so now we don't need those top level principle SMEs to do the day-to-day administrative work on our platforms. We can free up our resources, our people, to spend more time doing the value added activities to more directly impact our transplant community.

Jason Lopez:

What was once a program relying on tape recordings, has graduated to the cloud. It's reflected in strategic goals UNOS set down in 2018 to increase transplants, promote efficiency, but above all, improve outcomes for living donors, waiting patients, and those who live with transplanted organs.

Alex Tulchinsky:

Things are changing in the transplant ecosystem. It's changing for organ donation organizations. It's changing for transplant hospitals. It changes in the regulatory space as well. And so, because we are in the center of bringing all those folks together and others, we have to be weary of their needs, their changes, and how they change their practices and what the rules are changing for them too. So people want to be able to use the tools wherever they are, whenever they are, whatever they are doing. Whether they're in the office, or whether they're in the coffee shop. The whole mobility notion of being there is really, really important. And that's where we've looked at companies like Nutanix to help us create this always-on capability.

Jason Lopez:

Alex Tulchinsky is the Chief Technology Officer at UNOS. Tiwan Nicholson is the Director of IT Operations. In 2020, UNOS saw the most lives ever saved by deceased donors. There was a 6% increase in deceased donors over 2019. That's 10 years of record increases, and it meant 33,000 life saving transplants. And all during the COVID pandemic. This is the Tech Barometer Podcast. I'm Jason Lopez. If you like this story, take a look at other podcasts and print stories we're following at theforecastbynutanix.com.