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The Data Doctor

Alamance Regional Medical Center practices good medicine by updating its storage environment

July 2010 | by [Jim Utsler](#)

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Customer: Alamance Regional Medical Center

Headquarters: Burlington, N.C.

Business: Healthcare provider

Challenge: Cutting costs related to data storage and improving storage utilization

Solution: Deploying the NetApp IBM-branded N series storage solution to take the place of an expensive, overpowered storage infrastructure

Hardware: IBM Power Systems, System p and System i servers, four IBM BladeCenter chassis and IBM N series N5600 and N5200 storage devices

Software: IBM N series SnapManager for Virtual Infrastructure, IBM N series SnapMirror and SnapRestore, IBM Tivoli Storage Manager, VMware, and Citrix XenApp and XenDesktop

As IT professionals at nearly every level have discovered over the past several years, server virtualization offers a host of benefits, including reduced hardware footprints, lower power consumption and less administrative overhead. All of this, of course, correlates directly with cost reductions.

What these same people may not know, however, is that their storage infrastructures may not be keeping up with virtualization trends—and may in fact inhibit further savings. When looking at its storage environment, the Alamance Regional Medical Center (ARMC) discovered it faced just that quandary.

ARMC had virtualized many servers—and has even earnestly begun moving to a thin-client computing model—but was stifled in part by an older storage architecture that didn't quite fit with the organization's cutting-edge reputation. Realizing server virtualization was a great first step, ARMC also knew something else was missing, something that could help shrink IT costs even further.

Working closely with business partner Yorel Integrated Solutions, ARMC diagnosed the problem and found a cure in the form of the NetApp-based IBM N series storage solutions. Using that platform as a unified storage architecture, ARMC has seen many additional cost savings, including a \$90,000 annual reduction in its storage budget, a 65-percent decrease in storage requirements thanks to deduplication, and a savings of \$50,000 related to the purchase of new-capacity storage upgrades.

Overbuilt and Underutilized

Headquartered in Burlington, N.C., ARMC is a nonprofit healthcare provider serving local communities. It offers clinical, educational, preventative-wellness and other resources, including a 238-bed medical center, to some 200,000 people yearly.

Supporting this is an IT infrastructure recognized by the Healthcare Information and Management Systems Society, which has ranked ARMC as one of the top six hospitals in North Carolina and in the top 3 percent of hospitals across the U.S. in IT development and clinical information systems.

In addition to those accolades, says Jerry Moore, senior network administrator with ARMC, “We were named the top hospital in the country in 2005 by the Microsoft* Healthcare User’s Group for our clinical-physician order-entry system. And in 2006, we won an award from Network World for our application-virtualization project.”

Most of that virtualization is happening using VMware on a series of IBM System x* servers, including 3950s and 3850s (the former as production boxes and the latter as disaster-recovery boxes) and four IBM BladeCenter* chassis. The organization also hosts a mix of IBM System i*, System p* and Power Systems* servers running IBM i and AIX*.

Because of this mix of virtualized and physical servers, ARMC sought a way to consolidate much of its storage. It had been doing this to some extent before deploying the N series, but the organization found its existing solution lacking in some regards and expensive to maintain and scale.

“We had been using some IBM storage products in the past—and loved them,” Moore says, “but those solutions were somewhat expensive given our data-storage requirements and lacked the multiprotocol flexibility we needed. This last point was key, because of our wide-ranging server environment and the different protocols they support.”

ARMC as a whole felt it should cut costs wherever possible, without hampering patient care. The organization’s IT department was already well ahead of that curve, having virtualized many of its servers, but it saw yet another opportunity to reduce operational expenses by taking another look at its storage environment, which consisted of somewhat expensive devices and underutilized software and storage resources.

“We had enterprise-class equipment, but we’re a small or medium-sized organization. So it wasn’t so much a matter of anything being actually overpriced, but more that we weren’t using everything to its fullest extent,” Moore says. “If we had been taking more advantage of it, I could have justified staying on it and maybe doing things a bit differently. But as it was, we were pushing those boxes to less than 25 percent of their capabilities.”

Add to that the lack of multiprotocol support—especially in light of the organization’s continued support of physical servers and steadily increasing reliance on virtualized servers—and it was clear ARMC’s data-storage environment wasn’t quite the right fit. This became even more apparent as virtualized servers tried to access storage via only one channel. For example, only one virtual server on a panel could write to storage at a time, leaving other servers on that panel waiting for the initial connection to unlock. This caused performance issues as applications requested and then waited for data.

In a somewhat counterintuitive move, the organization determined, as Moore puts it, “that we could save a ton of money by scaling back—and not scaling up. What would be the point of that? We already had enterprise-class storage systems, but we weren’t using them to their full capacity. And if we had, we would have had to add more—and very expensive—disks. Looking back at it, that just didn’t make any sense in our case.”

Adding It Up

That’s when ARMC approached Yorel to help it find an alternative. Three months before ARMC committed to the N series, in December 2008, Yorel took ARMC IT representatives to an IBM and NetApp briefing center to learn more about the product. Yorel also provided ARMC with customer references from many companies that had moved from EMC storage products to the NetApp FAS series/IBM N series.

Based on the learning sessions and the customer referrals, it quickly became clear that a unified storage architecture—with low hardware and software licensing costs—was the way to go. The only question remaining was whether to go straight to NetApp and its FAS series or the IBM rebranding of FAS, the N series. “NetApp was great, because they told us it didn’t matter if we went straight NetApp or N series. The solution’s the same. But being a true-blue shop, and valuing our relationship with IBM, we decided to keep the solution IBM branded,” Moore says.

That out of the way, ARMC began configuring the N series to work within its environment. To that end, it purchased an N5600 system for production and an N5200 system for its disaster-recovery (DR) environment, which would use the N series-proven SnapMirror DR solution. It then began the migration process, moving its data from old storage devices to its new storage purchases.

Using IBM’s SAN Volume Controller (SVC), Moore simply flash-copied data from the older devices—one at a time—to the new ones. Next, he configured SVC to forget the previous devices and begin reading and writing to and from the new ones. “We migrated 75 servers over the course of four weeks, although we did put in a bunch of hours,” Moore says. “In fact, we were very aggressive about this because we were on a timetable to return equipment that was off lease. We didn’t want to keep paying for stuff we weren’t using.”

Once the migration was completed in May 2009, ARMC began seeing immediate benefits, including improved performance. Rather than relying on one connection per virtualized-server panel or per IBM AIX OS-based System p and Power Systems server (because IBM i doesn’t currently support N series connectivity, ARMC’s System i and i-based Power Systems use local DASD for storage), it now had multiprotocol connections that allowed simultaneous access to multiple data stores. This quickly addressed the data-return lags the organization had been experiencing.

Additionally, ARMC began deduplicating its data, which lets data be written to storage only once even if it appears in multiple locations. This can have a dramatic impact on how much storage is used, as in the case of ARMC, which Moore says “had an immediate effect on our data stores. In the past, we had to allocate at least 30 GB to each server. Now, we’re running 20-plus Windows* servers on a single data store using less than 100 GB total capacity. That’s a remarkable difference.”

Because the N series has less physical storage, ARMC is also seeing much better utilization, with the primary device running at around 80 percent capacity and the DR device, which also stores archived data, at around 90 percent. This means ARMC is getting much more bang for its storage buck, as the older solution ran at less than 25 percent capacity.

Migrating to the N series has also saved money. ARMC is saving a whopping \$90,000 a year using the N series compared with the previous solution, including the cost of hardware and controlling software. It’s also saving a respectable \$50,000 annually by avoiding expensive—and underutilized—new-capacity costs.

Additionally, the company has realized a power savings of about 6 percent. “It’s a guesstimate,” Moore says, “but we compared UPS (uninterruptable power supply) loads with the older system to the new one, and that’s about the number we came up with. Over time, that will add up quite significantly.”

Unrelated to the migration to the N series—but instructional nonetheless—is ARMC’s recent push to get rid of power-hungry desktop PCs. It’s doing so by replacing aging systems with thin-client displays that front a virtualized application server. Users will still be able to access critical office applications, but those applications won’t be hosted locally. Instead, fully functional versions will be served up from a centralized server using Citrix XenApp and managed using XenDesktop.

This, says Moore, “will reduce power consumption from 76 watts on desktop PCs down to three watts with our new desktop appliances. And when you couple those savings to the \$1,200 purchase price of a PC to the \$300 purchase price of the appliances, well, it’s pretty obvious we’ll be cutting a lot of overhead, both related to upfront costs and—because these appliances don’t have spinning disks and other potential hardware points of failure, or require individual software upgrades—ongoing maintenance.”

Combined Savings

Although server virtualization has become commonplace in many organizations, storage often isn’t taken into account. Most often, it’s simply there, inherited from another, older computing paradigm.

But as ARMC has demonstrated, storage should be taken as seriously as server consolidation, whether on BladeCenter or Power Systems servers. In fact, cost savings related to having the right storage infrastructure can be nearly as significant as virtualizing. And when combined, enhancements to both the server and storage environments can add up to a lot of change—pocket and otherwise.

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