The Biodesign Institute at Arizona State University

Software-Defined Storage Delivers Greater Productivity, Proven Uptime and Rock-Solid Data Protection

ABOUT THE CUSTOMER

The Biodesign Institute plays a critical role in advancing the research mission of Arizona State University. Encompassing 350,000 square feet of award-winning, state-of-the-art, LEED-certified buildings, the Biodesign Institute represents Arizona's single largest research infrastructure investment in the biosciences. Its talented researchers are pioneers of a dynamic new academic research model and hub of 21st century innovation, with the Biodesign Institute's convergent technologies and fields of research focusing on biomedicine and health outcomes, sustainability and security.

biodesign.asu.edu

The Biodesign Institute at Arizona State University (ASU) is a world-class translational research institute, turning basic discoveries from the bench to the bedside. With 350,000 square feet of state-of-the-art research infrastructure and more than 60 core faculty members, big science creates big data storage needs, and the Institute has relied upon DataCore since it deployed the company's flagship software-defined storage solution, SANsymphony™, in mid-2011. Although SANsymphony excelled at boosting performance – some applications saw as much as a 3-5x performance gain from existing storage due to DataCore's high-speed caching technology – performance was not the primary issue for the Institute. The primary concern at ASU was storage capacity. It needed a method of effectively and seamlessly handling the rigors associated with managing storage growth and storage capacity provisioning.

Beyond capacity management, an additional business driver had to do with a desire to improve uptime and have data protection that was fault tolerant. Another main technology driver at the time of selection was the fact that the Institute was getting rid of its old EMC storage controllers, as the costs and maintenance associated with EMC had become unaffordable.

"We were going to consider DataCore to fill the need we had for new storage controllers, however, we first tried a hardware approach and what unfolded was that we replaced EMC with X-IO storage and tried to leverage Dot-Hill controllers," noted Scott LeComte, senior IT manager at Arizona State University's Biodesign Institute. *"As it happened, the Dot-Hill storage controllers initially selected were unable to give us the flexibility we needed, especially in easily managing the growing volume sizes of X-IO disks, which was not an acceptable solution to the Biodesign Institute. In fact, it was X-IO that brought*

DataCore SANsymphony software-defined storage in to circumvent the capacity management issues and provided a path forward for the Institute."

The data footprint at the Institute is currently more than 300 TBs (of total, mirrored capacity). All this data is now managed under the control of the DataCore software-defined storage infrastructure. The IT team at the Biodesign Institute has seen firsthand both the cost containment and the risk reduction that DataCore provides. Accordingly, LeComte does not hesitate to say that DataCore is "mission-critical" to the Institute's overall IT infrastructure. In addition, DataCore also allows great flexibility in hardware choices. *"What we designed is a storage infrastructure that initially used X-IO storage and added multiple Dell storage devices – where DataCore adds its management, data protection, performance and capabilities to everything in the mix,"* he explained.

FEATURE-RICH STORAGE MANAGEMENT AND CONTROL

LeComte and his colleague, IT Systems Analyst Jorge Henriquez, are quick to point out the value of the complete set of storage services that DataCore SANsymphony offers in a single software solution. The Biodesign IT team can now easily and readily pool all storage capacity, as well as provide centralized oversight, provisioning and management to the whole discipline of storage administration. Moreover, they underscore that SANsymphony makes data migrations, hardware maintenance and hardware refreshes very easy to do. *"For instance, we can take a snapshot of data on a primary disk and mirror it to a disk on a different vendor's system without any issue, hesitation or single second of downtime – making SANsymphony a true multi-vendor platform,"* stated Henriquez. *"As is the case with so many SANsymphony features, this particular one comes standard along with a wide variety of features that are hardware agnostic and universally compatible."*

The Biodesign Institute at ASU takes on major challenges in human health, the environment and security. These themes are structured around the activities of 14 research centers, each with its own unique research activities and data needs. For example, one center is involved with DNA sequencing and human genome research, while another is involved in environmental biology and focuses on cleaning the environment. Still another – vaccinology and virology – focuses on viruses and limiting the effects of viral infections. Because the Institute is so research intensive, researchers are all required to save large amounts of data generated from experiments, many of which are longitudinal studies conducted over long periods of time. Researchers are called frequently to prove how they achieved a particular discovery – either by federal agencies such as the Centers for Disease Control (CDC) and the U.S. Food and Drug Administration (FDA) filing "first discovery" patent and intellectual property rights, or by a third-party company seeking to buy the research outright. The research findings must be both fully documented and extensively substantiated.

These research centers and every individual researcher on staff rely on the DataCore-powered storage infrastructure. This user community of more than 500 individuals covers the data needs of diverse research disciplines such as engineering, bioinformatics, high-throughput diagnostics and drug discovery. *"Research computing is a lot different than academic computing or administrative computing,"* noted LeComte. *"But since we implemented our new storage architecture two and a half years ago, DataCore has been pretty amazing. SANsymphony has allowed us to easily expand our IT environment and do so at a far lower cost."*

> " *DataCore has made our storage software-defined. As such, DataCore enables all the different storage devices that comprise our architecture to communicate and work with each other – even though they come from a wide mixture of vendors – thereby allowing the Institute to gain efficiencies and reduce our costs. Just as important is the fact that DataCore's software is portable and can reside in different locations, meaning we avoid a single point of failure by deploying two DataCore-powered nodes that operate synchronously, campus-wide and automatically can take over for each other in the event of a failure.* "
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> – Scott LeComte, senior IT manager at Arizona State University's Biodesign Institute.

THE POWER OF SOFTWARE-DEFINED STORAGE: COST CONTAINMENT, REDUNDANCY AND EQUIPMENT REUSE

LeComte and Henriquez both emphasize the benefits of DataCore's software-based approach to storage. For instance, the snapshotting feature delivers ease and flexibility. More benefits stem from the ability to create virtual disks that are thin provisioned, can grow in capacity, and are easily sized to meet their needs. For a storage-hungry user community that often spikes the need for storage capacity, DataCore's virtual disks ensure that the storage capacity "supply" meets the "demand" that users think they need. *"But in reality, the users' applications and systems get the capacity they need, but typically they only use a tiny fraction of what they think they require because DataCore regulates the capacity automatically and it is thin provisioned,"* explained Henriquez. *"This feature has been very helpful in terms of cost efficiency."*

Beyond managing the X-IO storage devices, which are the primary disks, the IT team at the Biodesign Institute has also added a secondary tier of Dell storage (Dell MD storage devices), which reduces the overall costs associated with the storage infrastructure.

Because the IT team can easily add less expensive storage devices alongside the more expensive ones that it already has in place (as is the case with Dell augmenting the existing X-IO devices), the cost savings inherent to this flexibility becomes very tangible. The Institute has seen the cost of supporting one terabyte (TB) of storage go down from $2,500 per TB to $1,000 per TB. This would not have been possible without a software-based storage virtualization architecture. This was accomplished without taking a performance hit, because DataCore's caching technology accelerates the performance of any storage under its management and control.

The Institute has found campus-wide synchronous mirroring with DataCore to be not only practical – because it is accomplished through the flexibility of software – but it has seen firsthand that this software-defined storage architecture virtually eliminates planned and unplanned downtime (delivering 99.999% or "five nines" reliability) by leaving not even a single point of failure. For the Biodesign Institute, primary storage now resides on X-IO devices and secondary storage resides on the Dell gear. Using DataCore, the data volumes are mirrored from the primary storage to the secondary storage, which is separated physically. *"If there is a problem in one location, we still retain the data,"* stressed LeComte. *"And of course, we are using backups and snapshots as well."*

Because it is using DataCore for snapshots and Veritas for backups, the IT team at the Biodesign Institute considers it a huge benefit that it can run backups off of a DataCore snapshot. *"The bottom line is that DataCore has allowed us to reduce our backup window times. What is more, with SANsymphony we can 'snapshot' and subsequently backup off of live data,"* said LeComte. *"We get a point-in-time backup and it does not affect our production."*

Beyond overall data protection and meeting the objective of enabling non-stop IT operations through data redundancy and failover/failback, the Biodesign Institute has benefited greatly by way of repurposing existing equipment. The EMC hardware, for instance, ran well over a year behind DataCore – primarily for backups and snapshotting purposes – before being decommissioned.

IT ENVIRONMENT AT-A-GLANCE :

- **DataCore Managed Capacity:** 350 TBs

- **Number of Users:** 500-600 users

- **Number of Virtual Servers/Hosts:** 43 virtual servers; 7 hosts

- **Primary Server Vendor:** Dell

- **Storage Vendor:** X-IO and Dell

- **Server Virtualization Platform:** VMware vSphere

- **Software-defined Storage and Storage Virtualization Platform:** DataCore SANsymphony

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When we first got DataCore, it was just amazing how easily it fit into supporting the Biodesign research environment so well," said LeComte. "The way it has opened up opportunities for significant cost savings by using other storage technologies is a really big deal for a state-supported institution like Arizona State University. We are very pleased with just how seamless and non-disruptive the solution has been and its flexibility has proven itself time and time again.
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ABOUT DATACORE

DataCore is a leader in software-defined storage. The company's storage virtualization software empowers organizations to seamlessly manage and scale their data storage architectures, delivering massive performance gains at a fraction of the cost of solutions offered by legacy storage hardware vendors. Backed by 10,000 customer sites around the world, DataCore's adaptive and self-learning and healing technology takes the pain out of manual processes and helps deliver on the promise of the new software defined data center through its hardware agnostic architecture.

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