

# Scottsdale Community College

## Virtual Storage Infrastructure Designed for Virtual Desktops

### Customer Snapshot

Scottsdale Community College, a two-year college located in Scottsdale, Arizona, enrolls approximately 12,000 students and employs around 1,000 staff. The institution has recently expanded enrollment with non-traditional learners such as working adults and people who take courses online.

Visit: [www.scottsdalecc.edu](http://www.scottsdalecc.edu)

### Quick Facts

With mySCC's virtualization strategies, SCC has been able to significantly reduce the total costs of its IT services while increasing the number of services and dramatically improving access to those services.

Virtualization has turned technology operations at SCC from a cost center into something that is actually funding innovation. For example, SCC now offers technology innovation grants from the money it is saving in its technology operations budget.

The responsiveness of virtualization environments and particularly desktop virtualization environments is closely tied to the availability and performance of the underlying storage infrastructure. So when Thin Client Computing, a DataCore Software reseller partner, architected a solution for Scottsdale Community College (SCC), they had to take stock of what could make the school's virtualization "vision" a reality.

In order to realize a fully virtualized IT environment, DataCore's SANsymphony software was deployed at SCC to enable the institution to use its existing storage equipment and devices to achieve the robust and responsive shared storage infrastructure necessary to support a highly dynamic environment that includes virtual desktops. This contrasts sharply with the alternative "rip and replace" approach, which is often prohibitively expensive and results in a rigid infrastructure that cannot adapt to future storage needs. Today at SCC, DataCore storage virtualization software complements Citrix XenDesktop to provide an end-to-end virtualization solution and an enhanced virtual desktop experience for approximately 12,000 students and 1,000 employees.

### The mySCC Virtualized Environment: A Complete Virtual IT Environment Powered by DataCore, Citrix and X-IO

DataCore SANsymphony and Citrix run with server hardware from HP and storage hardware from X-IO. Collectively, they power the mySCC (my Scottsdale Community College) virtualized environment. With mySCC's virtualization strategy, Scottsdale Community College has significantly reduced the total costs of its IT operations by \$250,000, while increasing the number of services offered and dramatically improving access to them through a richer, more powerful desktop interface.

"DataCore front-ends our X-IO storage arrays, synchronously mirroring across them and actually improving I/O performance by caching at the nodes," states Dustin Fennell, vice president of IT and CIO, Scottsdale Community College. "And next year, if we get a better hardware option in terms of price/performance, we can hang that behind DataCore too. By embracing total virtualization – servers, desktops and storage – the college is now saving \$250,000 a year that would have been spent on hardware had we not deployed best-of-breed virtualization solutions from DataCore and Citrix."

DataCore software runs on HP DL 380 servers and these DataCore nodes connect to X-IO Emprise 5000 hardware. The combination of Citrix's unique provisioning technology and DataCore's storage virtualization software dramatically reduces demands on storage and improves performance significantly – giving users maximum availability and performance from their virtual desktops.

### **Citrix Virtual Servers & Virtual Desktops – Consistency for Everyone**

The mySCC environment has been successfully serving its users base for more than two and half years. During that time, it has expanded from an initial launch of 45 core applications in a XenApp environment serving employees and a small cohort of students to an end-to-end virtualized IT environment comprising virtual desktops, which enable access to over 230 applications across all of SCC's faculty, staff and students. It serves the needs of students and employees, including both full-time and part-time staffers, as well as adjunct and residential faculty. Through mySCC's virtual desktop experience, users are presented with remote access to simple Windows applications like Microsoft Office – as well as more esoteric ones like AutoCAD. SCC sought to make its learning materials and resources completely accessible and affordable for any student – regardless of physical whereabouts, academic discipline and socioeconomic status.

"With mySCC we were seeking to give students the technologies of freedom," explains Fennell. "Many students either could not afford the software required for certain courses or the particular type of computer needed to run that software.

Now, rather than having to come on campus to use one of our PCs, mySCC serves as a convenient, central source for software application delivery and document storage. The system gives the SCC community an exciting and flexible way to access a multitude of software applications – both on and off campus."

The mySCC environment uses Citrix to virtualize their servers, applications and desktops. What is perhaps most impressive is what has been achieved in terms of virtual desktops. Out of the approximately 12,000 enrolled students, more than 7,500 unique users access the system. While the system load varies throughout the day, at any given time hundreds of users are on mySCC running applications on virtual desktops.

"We have taken a different approach to virtual desktops," states Fennell. "We look at just delivering applications – providing users with access. Some applications lend themselves to be virtualized in a Citrix XenApp environment and some lend themselves to be better virtualized in a Citrix XenDesktop environment."

Virtual desktops enable all students in a course to use the same resources, ensuring a consistent learning environment. In practical terms this means that an adjunct faculty member who teaches Adobe Creative Suite applications online and lives in another state can post project files in a shared folder that all the students can read. Fennell further illustrates this point. "If you look at a computer lab that is doing CAD work, you pay 'X' amount for 20 workstations. However, if you buy a server and run those workstations as virtual desktops, you can do so for the same amount or less."

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*- Dustin Fennell, vice president of IT and CIO, Scottsdale Community College*

## Combining Best-of-Breed Solutions to Deliver Services

### Storage Virtualization: DataCore software on 2 HP DL-380 servers

- » Each of the 2 DataCore storage virtualization nodes is currently licensed to support 32TBs each.
- » 2 X-IO Emprise 5000 ISE storage arrays to each node.
- » The Front end SAN connections used iSCSI, backend is 4Gbps Fibre Channel switched, synchronous mirror is 8Gbps Fibre Channel multipath direct connect.

### Storage Hardware:

- » 4 X-IO Emprise 5000 ISE, mix of 4.3TB and 8TB SATA Datapacks, RAID 5

### Citrix Software:

- » Citrix XenApp: 230+ published apps
- » Citrix XenDesktop: Higher resource applications such as AutoCAD & Adobe Suite
- » Citrix XenServer: 12 physical servers
- » Citrix GoToMeeting

### End-user applications:

- » Microsoft Windows Server 2008
- » Microsoft Office 2007/2010
- » Microsoft Visual Studio
- » MATLAB
- » Adobe CS5
- » Final Draft 8
- » LogMeIn Rescue

### Back-end applications:

- » AppSense
- » Symantec AV
- » SQL 2008

## Biggest Virtual Desktop Challenge: I/O Bottlenecks in Centralized Storage

Initially, Thin Client Computing attempted to use an existing HP LeftHand iSCSI SAN at SCC to cover the school's centralized storage requirements. While this was sufficient for an early stage virtual desktop "pilot" of what was to become the mySCC project, it was clear that the equipment did not – and never would satisfy the high throughput and the high availability needed to support the anticipated workloads.

"We moved from the HP LeftHand SAN to a DataCore software/X-IO hardware combination," says Steve Greenberg, CEO, Thin Client Computing. Greenberg explains that this shift was necessary to meet the higher level of performance and availability within the budget constraints of SCC. "It was very much a leap-frog situation – we went from something that was a bottleneck to a cost effective solution priced for the mid-market. The DataCore/X-IO blend actually exceeds the functionality of much pricier enterprise storage systems and yet delivers the same or better throughput."

Another important business driver for selecting DataCore software to virtualize the storage resources had to do with the productivity benefits of centralizing management and automating storage-related tasks across the college. IT administrators at SCC are now able to manage their older storage devices behind the same unified DataCore interface as the newer, higher-speed X-IO arrays. SCC centrally controls DataCore's comprehensive feature set across their entire infrastructure rather than being forced to deal with model-specific variations as is the case with device-by-device administration.

## The Virtualized Storage Infrastructure: Powering Today's Online, Digitized University of the Future

Tim Warden, director of Americas Sales Engineers at DataCore Software, serves as the technical lead for this solution. According to Warden, "Setting up a Virtual Desktop Infrastructure (VDI) environment is challenging, because of the significant demands it places on storage – the need for high performance, non-stop availability, and manageability across a diverse set of storage resources that can change over time. mySCC was designed to provide access to all the critical files and tools the users need, efficiently and immediately. That made mySCC a great candidate for the flexibility that results from deploying storage virtualization software across the board."

In this first stage, mySCC is configured to support over 30 terabytes on each DataCore storage virtualization server, or "node." To ensure high availability and no single point of failure, the DataCore software runs on two, redundant nodes. Each DataCore storage virtualization server and its corresponding, backend storage are synchronously mirrored in the data center. The IT team at SCC has the DataCore storage virtualization servers located on separate rack aisles. Each aisle has a separate server/storage switch that cross connects these nodes as well as two core switches each server/storage switch connects to. The Scottsdale Community College system recently opened up a second data center and its future plans are to extend the DataCore storage solution to that offsite facility.

"To me, mySCC illustrates what has almost become the opposite of server consolidation – because you are in effect leveraging servers to replace lots of desktops," notes Greenberg. "The role that DataCore Software plays in making thousands of virtual desktops possible should not be understated. DataCore is literally instrumental in orchestrating the virtualized storage environment

## IT Environment “At-a-Glance”

### DataCore Managed Capacity:

» 32 TBs

### Number of Users:

» 12,000 Students  
& 1,000 employees

### Primary Server Vendor:

» HP

### Storage Vendor:

» X-IO

### Server Virtualization Platform:

» Citrix

### Desktop Virtualization Platform:

» Citrix

necessary to support a virtual desktop deployment of this magnitude. It is powerful, flexible and reliable, DataCore fundamentally delivers what we require to optimize our heterogeneous storage environments – thereby complementing virtual desktop and servers to deliver the critical ‘third dimension’ of Scottsdale’s virtual infrastructure.”

### Bottom-line: A Perfect Fit for the Education Sector

System architects at SCC emphasize that a real benefit of the system has to do with being able to efficiently and flexibly store as well as provide data access to students who are consecutively enrolled – semester to semester. Some students, for example, may be enrolled at SCC part-time for five years. The mySCC system ensures that their data is kept intact for the duration of their affiliation with the Scottsdale Community College.

From the reseller’s perspective, Thin Client Computing sees Scottsdale Community College getting high-end, enterprise class performance, business continuity and great flexibility for a price that caters to the limited financial means of education customers. “Educational institutions may not have the million dollar budgets to pay for an EMC enterprise array, but their IT needs are the same – particularly when you are coping with 13,000 users,” notes Greenberg. “DataCore delivers all the high-end functionality these institutions need, at a fraction of the cost.”

In terms of hardware independence, DataCore empowers SCC’s IT team to choose the most cost-effective hardware devices to meet their specific storage needs. Rather than being locked-in to an expensive and rigid storage environment, now during each buying period SCC can negotiate the best value among multiple brands and models. In addition, with DataCore, Fennell and his team have been able to engage in “just-in time” purchasing – buying only the storage capacity they need, when they need it to support their data storage needs, thanks to features like thin provisioning and storage tiering. He explains, “With DataCore virtualizing our SANs, we could use our older storage devices for data that does not require high-performance and use X-IO for data that does. In addition, DataCore allows us to easily add SAN capacity as our needs grow -- so that we did not have to purchase everything from the start.”

The combination of DataCore’s storage virtualization software and Citrix’s server and desktop virtualization offering gets the best use and performance of SCC’s IT assets – giving users the maximum availability and performance from their virtual desktops. Better still, virtualization has turned technology operations at SCC from a cost center into a resource that actually funds innovation. SCC now offers technology innovation grants from the money it is saving in its technology operations budget.