

**Cornerstone OnDemand** must meet stringent service-level agreements for clients, so the performance and availability of its cloud-based global SaaS services are critical. By adding Pure Storage arrays into its infrastructure, the company has improved the availability and reliability of crucial customer-facing applications while shortening application-development times and reducing resources spent on storage management.

**BUSINESS TRANSFORMATION**

Thanks to a new IT infrastructure incorporating Pure Storage arrays and SQL Server's AlwaysOn features, Cornerstone OnDemand now offers its clients faster access to critical applications, more frequent reports, and service-level agreements that exceed industry best of breed.

**GEO**

Global

**INDUSTRY**

Cloud Services

“Pure Storage has given us a lot more throughput, speed and performance on our applications, which directly correlates to better response times for our clients.”

Reza Seraji, *IT architect*

**CORNERSTONE ONDEMAND ADDS PURE STORAGE TO ITS IT FOUNDATION**

For Cornerstone OnDemand, reliable access to data isn't just a hollow promise; it's the foundation of the business. As a cloud-based provider of talent-management services, the company has more than 2,700 clients worldwide who depend on its services for a broad range of applications, from recruiting, on-boarding, and learning and development, to performance management, succession planning, workforce analytics and more.

For three years in a row, Cornerstone has been placed in the “Leaders” quadrant of Gartner's Magic Quadrant for Talent Management Suites. Organizations of all sizes and across a wide variety of industries rely on Cornerstone's cloud-based solutions to source and recruit top talent, engage and develop employees throughout their careers, cultivate future leaders, and enable external networks of customers, vendors and distributors. Like any software-as-a-service business, Cornerstone has to deliver ultra-high reliability to its customers, and its contracts specify strict service-level agreements (SLAs) that can result in heavy penalties if those promises are not kept.

“We guarantee industry best-of-breed uptime guarantees to our clients in our SLAs, and we are pushing the envelope even further thanks to investments in technologies like Pure Storage,” said Reza Seraji, IT Architect for systems and applications for Cornerstone, which is headquartered in Santa Monica, California. “We had a stellar year in terms of overall global availability and uptime surpassing all previous years.”

**COMPLEX ENVIRONMENT DEMANDS ULTRA-HIGH RELIABILITY**

Maintaining a high level of reliability requires vigilance and a commitment to constant improvement. One of the techniques Cornerstone uses is to divide its applications into multiple failure domains (which it calls “swimlanes”), each of which contains multiple database servers and numerous SQL instances, application servers and Web servers. It also uses synchronous replication, a more expensive practice but one that delivers higher reliability in the face of possible failovers.

The goal of these and other practices is to ensure the availability of applications for all clients at all times. That can be a tall order, given that Cornerstone's client base includes 25 million end-users across the globe. Cornerstone leverages a unique database sharding methodology whereby each of the company's client organizations is granted their own database, ranging from a few GB to a few TB, depending on the client and the applications in their suite, and the amount of historical data they load into the system. That puts a lot of pressure on the company's storage infrastructure. “Our services are very data intensive,” Seraji explained, “so any latency will directly result in a negative impact on our clients.”

**COMPANY:**

Cornerstone OnDemand  
[www.cornerstoneondemand.com](http://www.cornerstoneondemand.com)

**USE CASE:**

- Database – Microsoft® SQL 2014 Server

**CHALLENGES:**

- The company must meet stringent client SLAs for application availability.
- Storage software upgrades must be done without disrupting client service.
- The company needs seamless storage maintenance and life cycle management and a flexible approach to managing data growth and security.

**IT TRANSFORMATION:**

- High-performing storage reduces time for database refreshes, leading to more timely reports for clients on how employees and managers are using key applications.
- Non-disruptive upgrades preserve uninterrupted availability of applications.
- Storage capacity can grow incrementally in synch with client expansion without forklift upgrades.
- Enhanced storage efficiency enables significant cost savings and avoidance of software and hardware licenses.
- Better-than-expected data-reduction rates reduce expenditures for additional storage.

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Reza Seraji, *IT architect*

The complexity of Cornerstone’s data environment is confirmed by Dave Linder, a technical account manager at Trace3, a consultancy that works closely with Cornerstone on its IT design and vendor selection. “They’ve got thousands of databases and thousands of table spaces within a single database that makes multiple copies of a customer’s entire workload. You can imagine peak performance demands at times like Fridays, month-ends, and ends of fiscal quarters. The complexity can pose challenges to their performance.”

In the quest for ever-greater reliability, the Technology Operations department at Cornerstone undertook a major re-architecting of its systems, primarily to migrate from Microsoft SQL Server 2008 to SQL Server 2014. A big incentive for that switch was to take advantage of the high-availability AlwaysOn features of SQL Server. As part of the transition, the TechOps team and Trace3 also decided to re-examine Cornerstone’s storage architecture with an eye to both strengthening resiliency and improving application performance. “Whatever we were going to do had to be better than what we ‘had’ been doing,” said Wes North, Senior Director of Technology Operations for Cornerstone. “We wanted to have a diversified storage platform that would continue in case of any failure or interruption,” Seraji said.

North had experience with Pure Storage at a prior company and recommended it be considered as part of the strategy to build a more diverse, high-availability storage infrastructure. “The importance of diversification and the proven life cycle management philosophy Pure has brought to market is radically changing the storage landscape, raising the tide for other vendors that can no longer ignore the impact storage disruptions have to companies like Cornerstone,” said North. To perform a proof-of-concept trial, the IT team and Trace3 inserted a Pure Storage array into the existing storage infrastructure at one of the primary data centers, then proceeded to assail it with load-generation tools and other stresses while at the same time pulling components from the Pure Storage platform. “The Pure array handled everything pretty well,” Seraji recalled, “and we also liked the de-duplication and compression features they offered, so we decided to diversify and strengthen our storage architecture with Pure.”

The POC compared Pure Storage against other storage providers, and Pure won on a number of counts, Linder says — ease of management, ease of expansion, replication, and reduced footprint. “The overwhelming factor was consistency and speed,” he said. “Even at full capacity and throughout, Pure still delivered consistent, sub-millisecond transaction times. The incumbent storage vendor was unable to keep up with that.”

**HIGH PERFORMANCE, MANAGEMENT SIMPLICITY SWING DECISION TO PURE STORAGE**

In the new architecture, Pure Storage arrays get an immediate replica of primary read/write traffic. So before a transaction is committed to a client, it is written to two storage platforms. This is done for both high-availability and disaster-recovery reasons. “Having this kind of diversified architecture allowed us to move to synchronous replication so that our customers don’t see any interruption if we have to troubleshoot a problem,” Seraji said.

Since introducing Pure Storage along with the upgrade to SQL Server 2014, Seraji noted, the company has seen a fourfold improvement in IOPS and sharply reduced latencies, leading to a 40%+ improvement in application performance for clients. “Pure has given us a lot more throughput, speed and performance on our applications, which directly correlates to better response times for our clients and less intrusive failovers if that ever becomes necessary.”

Further positive impact on clients has come from the ability to perform specific database refreshes more often. Previously, Cornerstone was refreshing its reporting databases every six hours. That was not frequent enough for many clients, who wanted faster access to updates on topics like employee training and inquiries for job openings. “With the AlwaysOn architecture and Pure Storage,” Seraji reported, “we are now able to refresh the reporting database within minutes, which provides clients with better, more frequent access to data that matters.”

Cornerstone has installed a total of six Pure Storage arrays in the FlashStack configuration (which combines Pure arrays, Cisco UCS servers and VMware software) — two each in its two primary data centers (one in the U.S. and one in the U.K.), and one each at disaster-recovery sites in their respective locations. Seraji noted that the company finished its migration to SQL Server 2014 nearly a month ahead of schedule, “and a lot of that was based on the Pure Storage arrays’ reliability and speed, which made the migration much quicker than anticipated.”

### **EFFORTLESS MANAGEMENT REDUCES BURDEN ON STAFF**

The ability to introduce new products and services is a critical element in strengthening Cornerstone’s competitive advantage, and the improved performance of Pure Storage arrays has proved valuable in this area as well by shortening application-development times. One of the biggest benefits of working with Pure Storage, Seraji said, is the ease with which the Pure arrays can be maintained and updated. “With our legacy arrays, we used to have a resource from our staff go down to the data center with our previous vendor to do a software upgrade. But with Pure the upgrades always go smoothly and never require our time.” In fact, according to Wes North, “even when less than optimal conditions are encountered Pure’s seamless recovery and maintenance capabilities reduce our total cost of ownership and administrative overhead significantly.”

Seraji said that non-disruptive upgrades are among the greatest advantages of Pure Storage. “It was hard to believe at first, but we tried software upgrades during weekday production runs and everything went very smoothly. We’ve done both hardware and software upgrades non-disruptively and it’s been a great experience.” The hardware upgrades were done after Pure Storage //m series arrays became available in the second half of 2015. The product was not yet available when Cornerstone made its initial purchase of the FA-450 array. When the //m series was available, the FA-450s were upgraded to //m70s, a process which Seraji described as “amazingly smooth.”

### **CONSOLIDATING ON FLASH PRODUCES BIG SAVINGS**

Another benefit of the Pure Storage arrays are cost savings across multiple dimensions. The de-duplication and data-compression features of Pure are “far beyond what other competitors were offering,” according to Seraji and have allowed Cornerstone to purchase less storage hardware, lowering capital expenses as well as operating costs in their data centers.

Another savings enabled by Pure Storage arrays has been in software license fees, which are always a major expense for companies that operate in the SaaS space. Seraji explained that with the capacity and speed of Pure arrays, the company has been able to defer and in some cases avoid additional licensing costs by leveraging much denser ratios of databases to physical servers.

Further savings have come from consolidating three types of database servers per “swimlane” into one server, running on Pure Storage, that performs faster and more reliably than before.

“With the AlwaysOn architecture and Pure Storage, we are now able to provide improved access to important data resulting in improvements in the user experience as well as product feature enhancements with our real-time data warehouse efforts.”

Reza Seraji, *IT architect*



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