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DataCore SANsymphony™ Software-Defined Storage Ensures Non-Stop Business Operations at "Convenience Store Chain of the Year" Thorntons

ROI SNAPSHOT

Thorntons initially purchased a Dell Compellent SAN for approximately $350,000, which included three years' worth of maintenance. Three years later, Thorntons paid $30,000 for one year of maintenance and did not renew the following year. The cost of two DataCore SANsymphony software-defined storage nodes with a new X-IO SAN, a new fibre channel switch, four hardware servers for the VMware ESX hosts as well as the other costs related to connecting the equipment to the disaster recovery (DR) site was just under $214,000. Additionally, the repurposing of the Dell Compellent SANs to the DR site was made possible only with DataCore SANsymphony serving as the software-defined storage platform. If not for the ability of SANsymphony to increase the speed and performance of the existing SANs, new equipment would have been needed on the DR side too. When asked, "is it safe to say that the deployment of SANsymphony software-defined storage basically paid for your DR site?" Schmidt responded, "Absolutely."

thorntonsinc.com

Thorntons, Inc. is a 40-year-old company based in Louisville, Kentucky that operates 162 gasoline and convenience stores, car washes and travel plazas across six states – Florida, Kentucky, Illinois, Indiana, Ohio and Tennessee.

"We pride ourselves not only in knowing what travelers and commuters want in fully-stocked food marts, but in having nice, clean and brightly lit stores," states **Kevin Schmidt,** senior network engineer, Thorntons, Inc. *"We take exceptional care of our properties – our stores – and we strive to be the biggest, brightest thing on the block. In terms of our IT systems, basic store functionality is critical and often contingent upon having our backend systems online and functioning all the time."*

The IT team at Thorntons has an exceptional working relationship with DataCore partner, The Mirazon Group, which has served as a trusted IT solutions advisor to Thorntons for over seven years. Schmidt is quick to point out how technology has changed since the time Thorntons was started.

Whereas much of its business operations used to be conducted using paper and telephones, today Thorntons relies upon a robust wide area network (WAN) and backend IT systems to support everything the business needs in order to function and adapt to rapid growth.

Prior to embracing virtualization, Thorntons was similar to most companies in the way the organization's IT needs were handled: racks and cabinets full of servers. It had different servers for different applications and storage resources were spread out across all servers, hoping to make the resources more usable. *"History shows that after three or four years on a server, you need to forklift replace it by changing it out and upgrading – that was us,"* states Schmidt. Having worked with DataCore software-defined storage at a previous company, once the opportunity came about to deploy a new solution on the storage side, Schmidt was quick to introduce executives at Thorntons to DataCore SANsymphony software-defined storage technology.

ADDING DATACORE'S SANSYMPHONY AND REPURPOSING EXISTING STORAGE INVESTMENTS

When Thorntons deployed DataCore SANsymphony software-defined storage in early 2011, the IT team reconfigured its storage area networks (SANs), replacing the primary storage with a different model. Schmidt and team were then able to combine all older Dell Compellent boxes and use them to create a proper disaster recovery (DR) and back-up site. The new virtualized storage infrastructure, which is located at Thorntons' primary data center, consists of DataCore's SANsymphony software-defined storage running in front of an X-IO ISE SAN. One SANsymphony software-defined storage system runs in front of the X-IO SAN, while another copy runs in front of the Dell Compellent SAN at the DR site. The systems are synchronously mirrored, whereby the primary site is connected to the DR site with an eight gigabit fibre channel and two fibre channel switches.

With so many locations -- operating across two time zones -- basic store functionality is imperative and the reason why Thorntons is such a write-intensive enterprise. There are literally transactions, clock-ins/clock outs and drawer tallies – based on shift changes – occurring at all hours of the day and night. Everything that Thorntons does at the store level is considered "mission critical" and is contingent upon system uptime. Thorntons gas stations and food marts do not shut down for any reason and are a true 24/7/365 operation. Mission-critical data includes point-of-sale (POS) information as well as other store-level information, such as employee clock-in and clock-out times, the "shift sheets" which summarize all the activity during a shift, and more.

All of this data is handled through the company's WAN and housed at the data center in Louisville. All data goes through a Web server, supported by a SQL database on the backend, where most of the data is managed. Thorntons also developed and deployed through its Intranet, a front-end, Web-based user interface to better manage all the information systems.

FOR FLEXIBILITY AND DATA PROTECTION: ENTER SANSYMPHONY FOR STORAGE VIRTUALIZATION

"With our current environment, all of the volumes are synchronously replicated," notes Schmidt. *"We have it configured so that all of the 'reads' come out of the primary SAN and 'writes' go to both the primary and the secondary SANs. Whenever we write any data to a database – or for that matter do anything on the system – it has to be written to both sides. This way all of our data volumes are very well protected."*

Years of relying on physical servers drove home the need for virtualization on the server-side and server virtualization has been in place at Thorntons since 2007. Back then, the virtualized environment was nothing more than VMware hooked up directly to a Dell Compellent SAN. According to Schmidt, this worked well and served its purpose, but after a while the SAN began to slow down, negatively affecting the response times for other systems. *"Once the disk space got to over 80 percent full, performance started to suffer,"* states Schmidt. *"Plus, write caching is already pretty marginal on the Dell Compellent SAN as well."*

Thorntons IT develops a lot of its own, propriety applications and systems in-house, including a POS system. This gives Thorntons real flexibility in the market in that it has the power to customize the system to suit its immediate needs. Two software developers at Thorntons are solely focused on developing and maintaining the POS system. The system is considered a competitive advantage for the company because if they want to develop something new or try something different by modifying the current system, Thorntons does not have to wait on a software vendor to issue a new release – or pay that vendor to develop something specifically tailored for them.

The same philosophy – *"empowerment through flexibility"* – is something the company applies to its backend systems as well. Two additional developers are focused purely on the backend systems at Thorntons, using Microsoft .NET. The company, according to Schmidt, does not buy off-the-shelf software to address many needs. All store applications are developed by his team. All business systems for its retail operations are accessible online over the WAN and housed at servers in the corporate office.

Thorntons runs a lot of Microsoft SQL Server databases on its backend, using seven SQL servers to support 160 databases. Everything the company collects at a store level, such as sales data, is stored in a SQL database and those systems are worked extremely hard, all of the time. As a result, the IT team maintains a robust backend system so that users can get what they need on-demand. Also hosted on the backend is Thorntons' own Microsoft Exchange server, responsible for the company's email, a Blackberry server and infrastructure security, etc. Currently, 15 terabytes (TBs) of data are supported by the DataCore-powered virtualized storage infrastructure and are mirrored for replication – bringing the total data pool across both sites to 30 TBs.

"We rely very heavily on our backend systems," explains Schmidt. *"What had always been a sore point for us with the Dell Compellent SAN was the write caching and the write speed. Reading to the disks was not as bad – but response times were still slower than what we had expected and needed."*

Moreover, the Dell Compellent SAN ran the risk of not meeting the data protection requirements Thorntons needed to ensure rock-solid business continuity, and this data protection issue needed to be addressed. It did operate two separate Dell Compellent SANs prior to deploying SANsymphony software-defined storage: The primary SAN manage the 15 TBs of data storage and had multiple controllers for redundancy and reliability, all connected to disk enclosures. The second SAN consisted of just one controller and one disk enclosure and was situated at the DR site, located in an entirely separate building on the Thorntons campus.

DELIVERING ON PERFORMANCE MANAGEMENT AND CAPACITY MANAGEMENT

Attaining non-stop business operations as well as better performance management and capacity management is what drove Thorntons to explore new alternatives to its Dell Compellent SANs that were deployed previously. Schmidt explains, that prior to DataCore, he and his team did not have the flexibility to get the most out of their virtualized servers, some of which was due to the configuration. But he stresses that prior to SANsymphony, replication using Dell Compellent was not very fast at all and that the idea of writing data to both SANs was no longer feasible.

"The write speed on the Dell Compellent SAN just did not allow us to do that," notes Schmidt. *"We were totally reliant on having everything on our primary SAN. If something happened to a volume, or something happened to some data, there would be downtime involved before we could get it back up – whether that was downtime to replace hardware, or downtime to retrieve data from a backup; that was our only option. We just did not have the flexibility we needed. We have it now with the DataCore SANsymphony software-defined storage hypervisors deployed as two, synchronous mirrors."*

Prior to adopting SANsymphony, Thorntons was also running low on storage capacity. Schmidt explains that they literally "hit the wall" with the Dell Compellent SAN and ran out of Tier one space. At that time, in order to get another disk enclosure, the company was forced to write a very large check in a hurry. A source of real contention had to do with the capacity overhead the Dell Compellent SAN relied upon, using a percentage of the overall disk space to facilitate automatically moving data between tiers of storage, from fast disks to slower disks,

depending on how frequently the data was in use. The downside was, while the IT team expected there to be 15 TBs of available disk space in its primary data center, there would frequently only be 11 TBs of usable storage available due to the overhead constraints imposed.

BETTER BACKUPS FOR VMWARE VMS WITH DATACORE SOFTWARE-DEFINED STORAGE

Physical servers are now few and far between at Thorntons and very little is run off of non-virtualized servers. In fact, over 90 percent of the systems are virtualized, including all production systems. Only a few servers – for example the development servers – are not virtualized, which is a preference of the developers. In addition, a testing environment is also left not virtualized.

Thorntons has standardized on VMware vSphere for its server virtualization. As part of the upgrade process to SANsymphony, in which Thorntons replaced its primary storage infrastructure and added DataCore software-defined storage, the organization upgraded the VMware hosts as well. In the primary data center, Thorntons has four VMware ESX hosts supporting 55 virtual machines (VMs). In the DR center, there are three ESX hosts, with no active VMs running – since the site is strictly for DR – but they can be deployed if needed.

Another key benefit of virtualization has been in making back-ups far more practical, and Thorntons had various scenarios affecting the process. A piece of software has been implemented to perform a back-up of all of the VMs at 7:00 p.m. each night. Back-ups of the SQL databases to a tape library were also conducted every night. Moreover, three times a week a full back-up of all the file shares throughout the entire environment is performed. These processes used to be an enormous headache because of the sheer amount of time required. Prior to the new virtualized infrastructure, back-ups of the file share to tape were only done once a week and only on the weekends. Previously, to back-up just two TBs of data to tape would require at least 35 hours.

The time it now takes to execute back-ups has been decreased substantially. Backing up the VMs has been reduced from just over 12 hours to six and a half. The tape backup of the SQL databases now require only seven hours where previously 11 hours was needed. And the full back-up, which used to take 35 hours to complete, is now done in just 15 – more than twice as fast. The difference, according to Schmidt, is DataCore. In fact, he emphasizes that the decision to increase the number of full back-ups from one to three times a week has been made possible by the speed of the new SANsymphony-enabled system.

"Since we went live with DataCore SANsymphony, the response from our user community has been fantastic," states Schmidt. *"It is almost night and day from what we had before and it is a significant improvement over what we were used to. I had worked with DataCore before, so I knew the benefits and I knew just how well it performed. Everyone else here was a little bit skeptical as to the speeds and other performance metrics we were claiming were possible with software-defined storage. Now, they are all believers."*

To illustrate, Schmidt refers to a profit and loss ("P&L") report that they would run on the former, non-virtualized system. This report used to take nine to 10 hours to complete. The first month Thorntons started using DataCore, that process was reduced to three and a half hours.

BOTTOM-LINE:

"The risk reduction that we have attained because we can replicate volumes instantaneously to both the primary and secondary sites has been of enormous value to us. We sleep a little better at night knowing we don't have all our eggs in one basket," concludes Schmidt.

Furthermore, this has all been realized with no degradation in functionality or speed – even with writing to two SANs in separate locations. In fact, quite the opposite is true because SANsymphony serves as a performance accelerator. Schmidt explains that the productivity increases are exceptional – enabling him and his team to do more on the system because they do not have to reserve the network space and utilize network bandwidth for back-ups. Nor do they require nearly as much time to perform them. He stresses that DataCore software-defined storage has given the IT team at Thorntons more time to focus on their core functions – to develop and deploy new technologies on the backend to further help drive the business.

Thorntons has 1,600 employees in total and all are now benefiting from the virtualized infrastructure. This includes not only the 175 users at Thorntons' corporate office, but also the overwhelming majority of users – consisting of store managers and customer service representatives – who work in the stores themselves. All are benefitting from the system because all of the store functions are supported by backend systems on their virtualized infrastructure.

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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