IDC
Analyze the Future

Buyer Case Study

Tintri Arrays Drive Business Improvements for Cloud Services Provider Cirrity

Eric Burgener

IDC OPINION

Externally, cloud services providers generally compete on performance, availability, and cost, relative not only to in-house infrastructure but also against other managed service providers (MSPs). Internally, they look for high-performance scalable solutions that meet uptime requirements in the six-nines range, are cost-effective, and provide easy multitenant management. Given that most cloud service providers are heavily leveraging virtual infrastructure to meet business agility requirements, flash storage is commonly deployed in them. Mixed virtual workloads generate I/O profiles that are very different from legacy client/server application environments, and virtual desktop infrastructure (VDI) is particularly demanding from a storage point of view. Legacy storage architectures designed around hard disk drives (HDDs) alone do not cost-effectively meet storage requirements in these environments. Cirrity, a channel-only cloud services provider, turned to flash-based array technology to more cost-effectively meet performance requirements when it brought up its first desktop-as-a-service (DaaS) environment in 2014. In testing both all-flash arrays (AFAs) and hybrid flash arrays (HFAs), Cirrity found differences in the ability to deliver a well-balanced performance as the number of desktops under management scaled. Storage cost per desktop was also a key purchase criterion, and Cirrity again noted wide disparities among competitive products. HFA products from Tintri, a Mountain View, California-based enterprise storage vendor, clearly outperformed competitive offerings in a rigorous bake-off performed in the late summer of 2014, delivering a storage cost per desktop that was 35% lower than other competitors. Key findings include:

- After deploying Tintri for its DaaS environment, Cirrity began to really appreciate Tintri's unique storage management advantages. An ability to manage storage at the individual virtual machine (VM) level as opposed to the LUN level made storage management much more intuitive, enabling Cirrity's virtual server administrators to effectively manage storage at scale.
- Tintri's performance and cost structure allowed Cirrity to lower service prices while improving performance and maintaining margins, and since its initial purchase, it has moved additional cloud-based services onto Tintri VMstore storage platforms.
- Cirrity now has a more aggressive offering relative to competitors, and its storage infrastructure provides a competitive advantage that translates directly to end-user benefits in improved service levels, lower costs, and increased agility.

February 2015, IDC #254414

IN THIS BUYER CASE STUDY

This IDC Buyer Case Study summarizes how Cirrity integrated flash-based storage solutions into its IT infrastructure to improve performance and manageability and lower its overall cost structure. We discuss the initial business problems Cirrity sought to address as well as what drove its decision to purchase HFAs from Tintri and how those solutions have transformed its business.

SITUATION OVERVIEW

Organization Overview

Cirrity is an Atlanta-based cloud services provider that offers turnkey services for virtual computing, both servers and desktops as well as cloud-based backup and disaster recovery that it sells exclusively to MSPs, value-added resellers (VARs), and service providers (SPs). Focused on the U.S. market, Cirrity has datacenters in Phoenix and Atlanta. Cirrity's solutions platform allows its customers to quickly offer turnkey cloud-based solutions services without the high cost and headache of building and maintaining their own cloud infrastructure. Cirrity's infrastructure as a service (IaaS), DaaS, disaster recovery as a service (DRaaS), and Revive BDR cloud backup services can be co-branded or white-labeled by its customers to help reinforce their brand.

The founders of Cirrity drew upon a long history, offering cloud-based services for one of the Southeast's largest resellers. President, CTO, and Founder Dan Timko and his team have built Cirrity's offerings on an extremely secure enterprise-class infrastructure. The company's datacenters feature onsite substations, multiple electrical grids, and redundant backup. It is also carrier neutral with access to a wide number of carriers and meets the Tier III Certification of Design Documents requirements. Security is provided by multiple layers of access control, biometric screening, a defensible perimeter, video surveillance, and guards on-premise 24 x 7. It also brings a wealth of certifications and partnerships to bear for its customers. Cirrity is AICPA SOC, PCI DSS, and HIPAA compliant; a VMware premier service provider; a Cisco Powered cloud and managed services provider; a Microsoft gold certified partner; and a Citrix partner service provider among other titles.

Challenges and Solution

Timko feels strongly that offering a wide breadth of services differentiates the company from pure-play hyperscale providers like Amazon and Microsoft Azure. In 2014, Cirrity added a DaaS solution based on VMware Horizon Air to offer its end users cloud-hosted virtual desktops and hosted apps. Its existing storage infrastructure was based on enterprise-class arrays from a leading vendor, but it was clear during the pilot of the VDI project that these arrays, even with added flash-based cache, were not going to cost-effectively meet the throughput or latency requirements of virtual desktops. Aware that there were newer arrays that had been specifically built for use with flash media, Timko began evaluating flash-optimized flash-based arrays (both AFAs and HFAs) from several different vendors. The objective was to purchase an enterprise-class storage solution that would meet Cirrity's performance, capacity, and cost-per-desktop requirements, specifically for the DaaS offering.

Cirrity's entire environment, not surprisingly, is based on a virtual infrastructure. Virtual workloads generate I/O profiles that are characterized by extreme variability in read/write ratios, a wide variability of block sizes, and I/O bands that drift over time (temporal and spatial locality), are heavily skewed toward random I/O, and have a high percentage of data that is reducible. Legacy storage architectures designed around HDDs cannot cost-effectively provide the performance that these types of environments need, and the widespread use of virtual computing bears a significant amount of responsibility for driving the very rapid growth of the flash-based array market.

VDI environments in particular generate a very unique I/O profile. They are characterized by up to a 10x difference in peak and steady state IOPS requirements. Boot, log-in, and application storms are very read intensive and put significant load on storage systems in large environments when shifts start. Log-out is extremely write intensive because it is driven by shifts ending, but steady state operation is also very write intensive, and read/write ratios of 20:80 are not uncommon with Windows 7 desktops. Space-efficient and scalable clone technology, coupled with inline deduplication in particular, is critical to keeping storage cost per desktop low in VDI environments because of the high percentage of data redundancy. Therefore, because of these requirements, flash-based arrays with these data services are very commonly used in VDI environments.

To take advantage of economies of scale, Timko planned to run as high a density desktop environment as possible while still meeting customer performance requirements. As he began to test various arrays, he noted balance issues. An array would run out of storage capacity while there was still lots of performance headroom left in the system, or it would max out on IOPS while there was still lots of capacity available. Timko had heard about Tintri from a professional colleague, who was working at a Tintri reseller, and brought the Tintri VMstore, a highly flash-optimized HFA, in for an evaluation. He noted that Tintri delivered a well-balanced performance, making efficient use of available resources, and that it cost about 35% less on a per-desktop basis than other platforms he had looked at from leading enterprise storage vendors.

Results

Timko ultimately chose a Tintri VMstore T650, an HFA that includes a mix of solid state disks (SSDs) and HDDs, for Cirrity's VDI environment. The VMstore uses intelligent caching algorithms to keep hot data in flash, consistently serving 99%+ of all reads out of it. All writes are acknowledged from flash in a manner that meets enterprise resiliency requirements, providing flash latencies. Certain volumes, like virtual desktop golden masters, can be pinned to flash all the time if necessary. Colder data migrates back to HDD for more cost-efficient storage but can be immediately promoted to flash again if required. Inline data reduction gets maximum capacity utilization out of the flash caching layer while at the same time maximizing flash endurance.

Although array management issues were not evaluated as part of the competitive bake-off, Timko was very pleased with how easy it was to manage storage with Tintri. An early differentiator for Tintri as a company was its ability to manage storage at the VM level instead of the LUN level, a feature it calls "VM-aware storage." Although the industry is becoming aware of the real value of that idea with the introduction of vSphere's Virtual Volumes (VVOLs) and Microsoft's ODX, Tintri has a very mature implementation that has been shipping since 2011. VM-aware management offers several key benefits:

- It improves the efficiency of resource consumption (storage capacity and network bandwidth) by allowing storage operations, like snapshots, clones, and replication, to be applied more granularly at the individual VM level as opposed to the LUN level.
- It provides a much more intuitive storage management model by allowing monitoring and storage operations to be effectively applied at the application level rather than the LUN level.

Cirrity's previous storage infrastructure was much more difficult to manage and in particular much more difficult to troubleshoot. Tintri's GUI allows administrators to view statistics at the individual VM level, making it much easier to identify "troublemakers" and resolve issues. The Tintri scheduler, which has a comprehensive view of all available system resources, allocates performance across all VMs as needed — there is no need to perform manual tuning. Tintri's ease of use allows more of Timko's staff, who are not necessarily storage experts, to effectively manage the environment, improving their productivity. Tintri's performance, along with its ease of management, encouraged Timko to look at putting some of the company's other cloud-based services on Tintri. Both DR and IaaS services are now also running on Tintri, and today, Cirrity has the original Tintri VMstore T650 as well as two larger Tintri VMstore T850s for a total of 90TB of raw capacity under management.

The Tintri operating environment provides a number of features that Cirrity is using to manage customer-facing cloud services. Inline compression and deduplication helped drive lower price per gigabyte than competitive vendors. Snapshots are used to back up the IaaS environment in conjunction with Veeam, and they are a heavy user of clones, which are integrated with VAAI for bulk provisioning, in their DaaS environment. Tintri's GUI allows it to view IOPS, throughput, latency, and flash hit ratio on a per-VM basis. This capability allows the administrator to immediately see the remaining performance headroom on a per-array basis to help direct capacity planning and monitor and control I/O for each vDisk to provide performance isolation and QoS at a VM and vDisk level. Competitive offerings do not provide this level of granularity because they only allow storage statistics from the array's point of view to be seen at the LUN level. During the course of regular operation, VMs are often moved around to different LUNs. Each LUN can host anywhere from 10 to 20 VMs, and as a result, it is very difficult to troubleshoot individual VM performance problems with conventional offerings.

Tintri provided Cirrity with a lot more confidence to take on heavy workloads, like large Exchange or SQL Server deployments, while still continuing to meet service-level agreements (SLAs) with its customers. Cirrity historically offered performance and archive tiers at different price points. With the transition of much of its infrastructure to Tintri, Cirrity was able to lower prices on these tiers while improving performance, making them more aggressively competitive against other cloud providers in the market. "Tintri's cost-effectiveness let us offer our performance tier to customers for about what we were charging for our archive tier before while actually improving its IOPS, throughput, and latency," said Timko. "This allowed us to price our offerings lower while still maintaining the same margins."

Timko also commented on the corporate culture toward service that made Tintri stand out. Having dealt with many of the major storage vendors over the past 20 years in the industry, Timko found it refreshing to deal with a vendor that seemed genuinely interested in Cirrity's success. He said, "They view their success as intrinsically linked with ours, and they're engaging with us on road map items that will allow us to move more of our workload onto their platforms going forward. I really like working with them."

ESSENTIAL GUIDANCE

For customers looking to deploy VDI, IDC highly recommends evaluating flash-based arrays that include space-efficient and scalable clone technology as well as inline data reduction (in particular deduplication). Since most customers, who are happy with the performance of flash-based arrays, quickly look to add more applications to them, it is also important to consider a platform's ability to host mixed workloads up front in the purchase process.

Because of their desire to run more cost-effective multitenant environments right from the start, service providers looking at flash-based arrays have focused on not only performance but also scalability, availability, and a wide array of proven data services. Arrays that include features such as space-efficient snapshots and clones, WAN-efficient replication, encryption, QoS, and storage efficiency technologies such as thin provisioning and inline data reduction will be best positioned to deliver aggressive total cost of ownership (TCO) figures in dense mixed workload configurations.

There is another key storage management feature that IDC expects will become part of the baseline requirement for enterprise storage arrays used in virtual environments: VM awareness. Tintri was one of only two vendors that supported this feature as far back as 2011, but now that VMware has introduced VVOLs, more and more IT practitioners are becoming aware of the key values it provides. VMware is slated to release its first production VVOLs API this quarter, but this only provides an API for vendors to implement VM-aware management. It does not provide that capability out of the box. It will likely take 6-12 months for most storage vendors to introduce their VVOL support.

IDC expects this support to roll out in two phases. In phase 1, storage vendors will support what looks like VM-aware management in their GUIs but monitoring and storage operations, like snapshots, clones, and replication, will still be occurring at the LUN level in the array. Phase 2 will deliver the full promise of VM-aware management, which includes not only more intuitive application-level storage management but also the efficiency of actually performing the storage operations at the VM level rather than the LUN level. Tintri today offers a very mature implementation of VM-aware storage management and will already support a phase 2+ VVOLs implementation when VMware releases VVOLs.

VM-aware storage management is important for several reasons. Having the ability to effectively perform storage operations at the VM level means being able to perform them at the application level. We've seen a trend for storage management responsibilities to migrate more and more to IT generalists. These administrators are very familiar with managing VMs and applications, but they are less storage savvy. More intuitive VM-aware storage management makes it much easier for these types of administrative resources to manage storage, making them more productive. Cirrity noted the value in being able to have more of its staff, who are not storage experts, manage its virtual storage

infrastructure. More granular VM-aware storage management uses other resources such as storage capacity and network bandwidth more efficiently. In addition, the ability to correlate I/O workload and storage profiles very specifically with individual VMs makes troubleshooting, application management, and tuning much easier. The fact that virtual computing is the future means that VM-aware management is the future as well.

LEARN MORE

Related Research

- *Worldwide All-Flash Array and Hybrid Flash Array 2014-2018 Forecast and 1H14 Vendor Shares* (IDC #252304, November 2014)
- *IDC's Worldwide Flash Storage Solutions in the Datacenter Taxonomy, 2014* (IDC #250560, September 2014)
- *Executive Interviews on Flash Array Deployments in the Enterprise* (IDC #249884, July 2014)
- *Flash-Optimized Storage Architectures* (IDC #249295, June 2014)

About IDC

International Data Corporation (IDC) is the premier global provider of market intelligence, advisory services, and events for the information technology, telecommunications and consumer technology markets. IDC helps IT professionals, business executives, and the investment community make fact-based decisions on technology purchases and business strategy. More than 1,100 IDC analysts provide global, regional, and local expertise on technology and industry opportunities and trends in over 110 countries worldwide. For 50 years, IDC has provided strategic insights to help our clients achieve their key business objectives. IDC is a subsidiary of IDG, the world's leading technology media, research, and events company.

Global Headquarters

5 Speen Street
Framingham, MA 01701
USA
508.872.8200
Twitter: @IDC
idc-insights-community.com
www.idc.com