

BUYER CASE STUDY

Arnold Worldwide Rides the Perfect Storm to Virtualization and a Compellent SAN

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IDC OPINION

Virtualization is taking the datacenter by storm. It affords better server resource utilization, improved availability and reduction in footprint, and power and space requirements. Moving to a virtual machine environment often brings about other changes in the datacenter, most often a move to or expansion of shared storage or SAN storage configurations. Arnold Worldwide, a leading advertising and marketing communications firm, was facing several challenges in 2006 that drove it to evaluate and implement server virtualization on a shared SAN:

- ☒ First, the company was facing physical, cooling, and power constraints in its datacenter.
 - ☒ Second, the firm needed to improve storage reliability and uptime while implementing a solution to handle recovery from different types of failures and disasters.
 - ☒ The combination of VMware to increase server utilization and availability and a Compellent SAN for disaster recovery, improved storage utilization, reliability, and uptime addressed Arnold's challenges.
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IN THIS BUYER CASE STUDY

This IDC Buyer Case Study provides an overview of Arnold Worldwide's datacenter challenges, the options it considered in addressing these issues, and the infrastructure changes it made. IDC recently spoke with Greg Folsom, vice president senior director of IT, at Arnold Worldwide to better understand the firm's environment and benefits in implementing both VMware and a Compellent SAN and the effect these changes had on utilization, availability, and reliability.

SITUATION OVERVIEW

Organization Overview

Arnold Worldwide is a 60+ year-old, United States-headquartered marketing communications agency with a full suite of capabilities in areas such as direct marketing, brand development and integration, business strategy, design, media, integrated analytics, entertainment, and diversity-based marketing. Arnold Worldwide

is a subsidiary of Havas Advertising, the world's sixth-largest communications group. Based in Paris, Havas has three operating divisions, one of which is Arnold Worldwide. Arnold is headquartered in Boston and has two full-service agencies in New York and Washington, D.C., seven regional offices throughout the United States, and a complete network of global offices in 75 countries around the world. Serving large multinational Fortune 500 clients, Arnold Worldwide has expanded beyond the Americas and recently opened an office in London.

Arnold's IT infrastructure spans three regional datacenters: Boston, New York, and Washington, D.C. Arnold's IT strategy is that each of the three main offices can operate standalone if network connectivity to the main Boston-based datacenter is lost. For example, a critical application such as Xinet's WebNative application suite, used to support development, operation, workflow, and digital asset management of creative content, is run locally in each of the three datacenters. Other applications, such as financial applications, expense management, and human relations systems are outsourced hosted applications that Arnold employees access over the Internet. The Exchange messaging system is supported out of Boston, and all email to other offices is routed through the Boston location.

Challenges and Solution

In 2006, Arnold Worldwide was facing several significant challenges driving it to rearchitect its datacenter environment. First, the company was facing physical HVAC constraints in its crowded, overheated Boston datacenter. Being part of the Prudential high-rise in downtown Boston, the firm was running out of available HVAC resources to cool its datacenter to keep the computers running at normal temperatures. According to Greg Folsom, vice president senior director for IT, "In the event of an HVAC failure, datacenter temperatures would escalate to 110F within two hours of the failure. Before we got vigilant about monitoring the environmental conditions, we had an HVAC failure that melted the laminate on the back of a few raised floor tiles. We were looking for ways to reduce our cooling requirements, simplify our server and storage management, and decrease our electrical consumption."

Another issue the firm faced was reliability and uptime. Arnold faced a series of hardware failures with its existing 4TB SAN, whereby two controllers failed over the course of a three-year maintenance window. These failures caused unnecessary downtime. While the three-letter storage supplier offered redundancy at the storage controller level, the proper failover to the redundant storage controller card did not occur and caused an outage/loss of connectivity to the critical Xinet host. While the outage was remedied, the failure raised concern for Arnold and caused unnecessary downtime. Last, the company wanted to achieve better operational and disaster recovery. Not only did Arnold want to leverage the New York datacenter as a DR site, it wanted to achieve server level recovery. It also needed to improve its recovery points from a previous 24-hour backup to more granular recovery points. Folsom said, "We needed to improve our recovery from many different types of both failures and disasters."

Options Considered

Arnold started by discussing its power and cooling, reliability/uptime, and recovery challenges with its strategic reseller, TriAxis, based in Auburn, Massachusetts. TriAxis has steered the company to several strategic best-of-breed technologies already, such as DataDomain for deduplication and Mimosa Systems for email archiving. Folsom commented, "TriAxis is a great partner for us. When we have had a disk problem in the middle of the night, and I ask what needs to happen, the president says, 'You should not do anything, let me take over from here.'" While the network group at Arnold knew they wanted to look into virtualization, they also knew that the complete solution would necessitate a more robust, properly sized SAN. VMware would allow them to cut their physical footprint, reduce HVAC requirements, and improve utilization. From there, Arnold also wanted to leverage many of the advanced VMware features such as DRS and Vmotion, which required shared storage. Arnold then evaluated different options for shared storage for their new VM environment as follows:

- ☒ Upgrade or trade-in of its existing storage system/SAN. While Arnold did have previous reliability challenges with the incumbent storage supplier, it was prudent to evaluate pricing and features of this option. With a previous SAN with a single host attached, moving to a virtualized environment would place 80% of its systems on the SAN. This change did increase the importance of back-end reliability for Arnold and drove it to evaluate other SAN options as well. The older SAN was coming off maintenance and was expensive to renew. Arnold looked at upgrade or trade-in of the existing system, but the pricing for additional software options, in combination with base storage pricing, ruled this option out.
- ☒ Move to a network-attached (NFS/CIFS) storage system. Arnold evaluated one of the leading NAS suppliers as the back-end storage for its main Windows file servers and to host its VM environment. One of the applications Arnold intended to virtualize was file sharing, which included an application from Group Logic called Extreme ZIP, an application critical to supporting interoperability and file sharing between the creative Mac-based systems and the business-oriented Windows-based systems. This application, which runs as a Windows service, could not run on the suppliers' proprietary operating environment; this eliminated the option.
- ☒ Evaluate another SAN supplier. Although the company reviewed materials and architecture for NAS devices, TriAxis recommended to Arnold it evaluate Compellent, an innovative, best-of-breed storage supplier. Critical to the decision to put Compellent into a testing and evaluation cycle was the ability to satisfy Arnold's price and functionality requirements. Arnold was looking for a cost-effective Fibre Channel SAN, which would easily operate with virtual machines. Arnold also needed a reliable back-end architecture and features such as remote replication, thin provisioning, snapshots, and automatic tiered storage within the box (ILM). Other considerations included ease of use, product support postsale, and ease of upgrade.

Implementation of Compellent

Arnold brought the Compellent solution in-house October 2006 and tested out the system until December. Based on the results of the evaluation, Arnold decided to commit to start deployment of Compellent into production by January 2007. By the end of January, Arnold placed its less critical systems on the Compellent SAN and expanded to critical systems over the course of the next few months. The migration of the data off the older SAN and distributed storage to the Compellent SAN was planned over a maintenance weekend. The migration was done using standard bulk copy utilities; namespaces were updated on the client side.

Arnold currently runs two physical 2GB Fibre Channel Compellent SANs: one in Boston, and one in New York. The New York site serves as both a production site and a DR site for Boston. The Boston datacenter houses 50 Windows systems, of which 40 are virtualized using VMware. The 40 virtual machines run on four physical hosts. Additionally, in the Boston location, the firm has one Solaris server supporting the Xinet application and Microsoft Exchange, which also supports all three primary office locations. All virtual hosts, the Xinet system, and the Exchange system are attached to a 37TB Compellent SAN, which is running at a 75% utilization rate.

The New York datacenter supports two physical hosts and 8–10 virtual machines and runs critical applications such as Xinet and file and print and Web services standalone, but it also serves as a mirror for the Boston office. In addition to the full mirror of the 27.75TB of the Boston data, the New York office also supports an additional 8TB of storage capacity. The New York site is running at 50% storage utilization. Today, approximately 80% of the Arnold storage environment is on Compellent, and the company plans to move that to 90% in the next 12 months. Arnold will not put the remaining 10% on Compellent for systems that are not virtualized and not critical to the business.

Arnold is currently using the following Compellent software features:

- ☒ **Data Progression (automated tiered storage).** Arnold currently has two tiers of drives within its Compellent system enclosure. Tier 1 is standard 15K Fibre Channel drives for high I/O requirements and tier 2 is slower SATA drives and can be used for snapshots. The Compellent automated tiered storage software is called Data Progression. Data Progression lets Arnold set up data classification and policies to automatically migrate less frequently used data to the tier 2 drives. For Arnold, the benefits of this feature include reduction in disk expenditures for tier 1 storage, automatic migration without cost and overhead of application-based ILM, and increasing performance by moving inactive data off Fibre drives.

Note: Something unique with the Data Progression software is that it moves the blocks within a file. For example, if there's a large database such as SQL, Oracle, or Exchange, the Data Progression software will move the blocks within the database tables and index to the right tier of storage without moving the entire file. The data movement is bidirectional; blocks can be moved up or down. As the rate of access changes for blocks of data, their allocation on different tiers of storage will change as well.

- ☒ **Dynamic Capacity (thin provisioning).** According to Arnold, the reason it likes the thin provisioning feature called Dynamic Capacity is because when it wins new business and a new client comes on board, it has to ingest digital assets such as previously created logos, graphics, pictures, and so forth. With a fixed amount of disk space they would fill up, need to archive, fill up, need to archive. With the Dynamic Capacity software, Arnold has more flexibility to work and not be limited by the hardware or physical capacity. It also gives Arnold a very specific understanding of when it will run out of disk space down to not only the days but also the hours and seconds. This helps with capacity, purchasing, and project planning.

Note: The Compellent architecture was designed with thin provisioning functions from the start, and Compellent's dynamic capacity feature can support taking normally provisioned or legacy volumes and convert them to thinly provisioned volumes.

- ☒ **Data Instant Replays (snapshots).** While the firm needed a DR solution, it also needed the ability to recover from many different scenarios. The implementation of Data Instant Replay software enables the recovery of any size volume to any server in the event of disruption. Administrators can create an unlimited number of replays per volume, while other solutions do limit snapshot numbers. In fact, Arnold has relied upon these Remote Instant Replays. As a test, a Windows directory was deleted and caused a server not to reboot. The system was running inside a virtual machine that was on an Instant Replay. Administrators used a VM image on an Instant Replay snapshot from 2 p.m. as a source for recovery, and the Windows machine rebooted. This recovery scenario took 10–15 minutes while rebuilding the server; restoring the data would have taken hours.

Note: Unlike full mirrors from other vendors, Instant Replays consume less capacity by not requiring an initial full mirror. While Arnold still uses its CV and DataDomain B2D solution, it calculates it has reduced its RPO of six hours by replay of last snapshot versus going to the previous night's backup.

- ☒ **Remote Instant Replay (Remote Replication).** Critical to Arnold's strategy was incorporating remote replication into its SAN to enable disaster recovery. Previously, the company was reliant upon backup to disk with offsite backup to tape as a means for recovery from a site-level issue. This left the firm in a place of vulnerability in serving clients and processing new creative projects. Arnold currently uses the Remote Instant Replay software to replicate only the changes from its local Boston-based 37TB SAN from Boston to New York. The Compellent Remote Instant Replay replicates continuous snapshots, called "Replays" between Boston and New York, ensuring business continuity.

Note: The Remote Instant Replay feature offers excellent economics over traditional remote replication. The economic savings can be achieved by making use of IP-networks versus Fibre Channel, thinly provisioned volumes, and creating volumes based on actual written data versus requiring preallocation of space at the remote site. With Remote Instant Replay, Arnold can go back to the last snapshot for recovery, taking only minutes.

Not everything was perfect in implementation. The day Arnold went into production with the new Compellent SAN, one of the Fibre Channel drives failed. It happened on a Friday afternoon, and the 4-hour replacement window was missed because the wrong drive was shipped to the customer. By Sunday, everything was rectified and the rest of the implementation was uneventful. Overall, Arnold has had a great experience with the Compellent customer service. According to Folsom, "When drives get bad sectors, Compellent will call us proactively and ask us how we want to handle it. Do we want to mark the drive with bad sectors and rebuild on the hot space or do we want them to come in and replace the drive on Monday?" Arnold likes that Compellent is proactive and understands its business and always provides options for how to handle different situations.

Results

According to Folsom, "This whole datacenter rearchitecture has been a perfect storm for us. The servers were aging, we needed to reduce power and cooling consumption, and reduce equipment, while, at the same time, we needed better reliability, uptime, and recovery from different scenarios. We would not have been successful without both VMware and the Compellent SAN for back-end performance, reliability, and uptime features. We view VMware and Compellent as going hand in hand."

Benefits of the VMware and Compellent SAN include the following:

- ☒ **Uptime.** Folsom says, "We are not running out of disk space and are pleased with the 75% storage utilization rate in the Boston datacenter. We have not seen a controller failure, and the cost-effective replication and recovery features have improved our ability to recover."
- ☒ **Utilization.** VMware has helped reduce the server footprint. The datacenter is cleaner, with reduced heat output and reduced management of servers. Consolidation of storage on the Compellent SAN and use of its thin provisioning feature allowed Arnold to achieve reliable storage utilization rates while also reducing power requirements.
- ☒ **Administration.** This has changed the Arnold datacenter. With both Compellent and VMware, everything can be done remotely. Tasks such as reboots or restores can be done by an administrator from home. According to Folsom, "We can seal access to our computer room and still do our job. After a member of the network team decided to leave, we found we did not have to replace him with a senior person because of the simplification we had put in place."

TABLE 1**Arnold's IT Environment Results: Before and After**

Criteria	Before	After	Resulting from
Server utilization	5–15%	30–50%	VMware
SAN utilization	5%	80%	Compellent SAN and VMware
Storage utilization	40%	75%	Compellent SAN
FTEs managing	3	2	VMware and Compellent SAN
Recovery time	Hours/days	Minutes	Compellent SAN
Recovery point	24 hours	6 hours	Compellent SAN
Physical footprint	7 racks	3 racks	Compellent SAN and VMware
Heat output	Lots	Not so much	Compellent SAN and VMware

Source: IDC, 2007

Future Plans

In the next 12 months, Arnold plans to expand its Compellent storage capacity. With this step, 90% of the firm's storage capacity will be virtualized and running on the Compellent SAN. Arnold intends to move to version 4 of the Compellent Storage Center software, which has some interesting deduplication and disk optimization features that allow for blocks to be moved to the outside of the platters. Arnold feels comfortable moving to the next release of software and has already done what was described as "completely painless updates," where it relied on a single controller during a maintenance window for the software upgrade of another controller in the pair.

However, Arnold does note it needs to tame storage consumption and is looking at ways to more intelligently manage storage retention and disposition. Hence its interest in deduplication. The firm is also looking at options such as file virtualization and HSM but points out it needs these file services for Windows, Unix, and its Apple computing environment. Longer term, Arnold would ideally like to archive long-term, fixed content records out of the Compellent box to some kind of cheaper mass storage for long-term archive. Arnold acknowledges that this mass storage would have less redundancy but would ideally be spinning to better manage automatic file migration.

ESSENTIAL GUIDANCE

Users considering a move to virtualization should consider the benefits that can be achieved by moving to shared storage. Once the benefits of a SAN are well understood, firms should evaluate different storage suppliers, both incumbents and new entrants, to understand the economic and functional benefits of different storage architectures.

LEARN MORE

Related Research

- ☒ *Compellent C-Drive 2008: A Grassroots Approach to Driving Next-Generation Storage Architectures* (IDC #RS54Q, May 2008)

- ☒ *Worldwide Disk Storage Systems 2008–2012 Forecast: Content-Centric Customers — Reshaping Market Demand* (IDC #212177, May 2008)

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