Computer Weekly storage case studies: Winners of the 2013 European User Awards for storage
Winning case studies in the 2013 Computer Weekly European Awards for storage

Anthony Adshead discovers what made the winning entries stand out from the crowd

Case study: Further education college graduates to near all-virtual with Dell Compellent SAN

Winner for the best public sector project

The College of North West London (CNWL) has replaced its ageing EMC storage area network (SAN) with Dell Compellent tiered storage in a £300,000 project that has already netted savings of £35,000 in server hardware and power costs in the few months since deployment.

Deployment of the Dell Compellent SAN has enabled widespread virtualisation of servers, desktops and telecoms systems to bring these hardware and power savings.

CNWL in Brent, a further education college with 700 staff and 12,000 students, delivers more than 3,500 desktops from two main sites at Willesden and Wembley that act as datacentres.

IT underpins the entire curriculum and there is a drive towards paperless working for staff.

Storage requirements are driven by the need for capacity for Microsoft Exchange email data, CCTV recording and its Microsoft Lync 2013 software-based communications system. The spur to replacement of SAN capacity was the existing EMC array’s imminent lack of support.

Garod Barker, head of IT at CNWL, says: “We had an EMC CX4120 deployed but capacity was growing rapidly – about 100GB a month – and we needed to look at replacing it when EMC said it would only renew the warranty for another two years. It was basically at end-of-life after only four years.

“EMC wanted to sell us the next version, but we were concerned how long that one would last before being end-of-life too.”

After evaluating a number of SAN products from EMC and HP, CNWL eventually deployed dual Dell Compellent SC040 SAN controllers with 58TB capacity at its main Willesden site with tiered 600GB SAS (10TB) and 3TB Sata drives (48TB).

Data with high performance demands, such as CCTV, email and Lync, resides on the SAS tier, with secondary data relegated to Sata.

There is no flash tier, for reasons of cost, says Barker. “We looked at SSD and fast Fibre Channel disk, but we considered we had enough performance with what we had.”

At the secondary Wembley site it has one SC040 controller with 50TB as part-production, part-disaster recovery storage capacity, with 45TB on bulk Sata and 5TB on faster SAS. That site will be superseded by a new second datacentre planned at the Willesden site, 200m from the existing facility.

A key benefit of the Dell Compellent SAN has been its role in helping CNWL increase the use of virtual servers and Microsoft’s Lync 2013 unified comms system.

“We’re reducing hardware in the server room by hosting virtual machines and Lync on the SAN and have saved about £35,000 so far,” says Barker. “We’ve also reduced power use by 12 amps and our UPS [uninterruptible power supply], which was once good for two hours’ uptime, is now good for 3.5 hours.”
Another benefit is Compellent’s relative ease of use, says Barker: “The GUI in Compellent is very simple to use. Navisphere in EMC is very clunky in comparison. The snapshotting and Data Instant Replay, which syncs instances on each SAN of, for example, VMware images, SQL databases, etc, is an added bonus.”

Barker’s only quibble with the Compellent SANs is an issue with drive trays. “We were half way through the install when Dell changed the drive trays. Now we have the old and new versions and they’re not backwards compatible.”

### Case study: Angry Birds firm handles massive growth with Riak NoSQL database

**Winner of the best technology innovation award**

The company behind the Angry Birds game franchise, Finland-based Rovio Entertainment, has deployed the Riak open source distributed database from Basho to deal with masses of data associated with nearly two billion downloads from more than 250 million monthly users.

Rovio was formed in 2003 and has grown at a massive rate, with 700 employees. It has headquarters in Finland, the US, China, Sweden, Japan and the UK.

The growth experienced by the company put enormous strain on its data capabilities. Rovio needed to ensure its high service levels could be maintained in a cost-effective way. To add further complexity, data transactions across multiple platforms, including smartphones and tablets, meant that investment was needed to keep the user experience consistent.

So, to deal with the high influx of data and peak load times, Rovio needed a database that could support viral growth without failing and causing downtime. Similarly, if demand was lower than anticipated, flexibility was needed to ensure infrastructure could be reined back, avoiding unnecessary expenditure.

### Choosing the Riak NoSQL open source database

Rovio eventually deployed Basho’s scalable NoSQL open source distributed database, Riak, on Amazon Web Services (AWS). This has enabled it to economically and effectively manage increasing data volumes resulting from its growing number of data operations, says Ari Talja, lead server architect at Rovio.

“We started the design and the implementation of our cloud stack based on the huge figures we have for Angry Birds fans. We knew that we needed to be prepared for massive usage and be ready to scale up quickly when needed,” says Talja.

Riak was chosen, says Talja, because it fits well to Rovio’s requirements and supports diverse set of use cases.

He listed the reasons the company chose the database: “Where Riak excels is, it does not lose data in any situation and therefore can be used to store critical data such as payment transactions; it’s horizontally scalable and supports extremely large and dynamic data sets; it has no single point of failure; it supports multi-datacentre deployments with real-time data replication; it is easy and robust to operate; it can be operated on any public and private cloud; and it has a good developer support programme.”

### Flexible approach to managing data

Rovio’s IT team is now able to scale from tens of Riak servers to hundreds, based on customer demand.
Rovio has benefited from Riak’s low-latency features and replication of data across multiple nodes within the database, providing a high tolerance for hardware failure without losing critical user data. If one node fails, the system maintains its performance profile. Multiple data formats are also supported.

Internal development has also become more streamlined since implementing Riak. A new in-house user interface, Bigbird Library, has been created on top of Riak to provide Rovio’s developers with a consistent and simple interface. This makes it easy for developers to take new features into use or tweak existing use patterns when necessary, says Anna Koivu-Choo, lead server developer at Rovio.

“The Riak clusters have different kind of setups optimised for various use cases, as the needs of a cloud sync service differ quite a bit from those of an ad platform,” says Koivu-Choo. “Some of the clusters are used by a single service while others are shared. But all services use the same in-house abstraction layer, BigBird Library.”

Case study: Movie FX house gets Avere NAS caching for Gravity production

Winner of the supplier of the year award

London-based film special effects production house Framestore deployed Avere NAS acceleration and caching hardware to cope with the demands of special effects work on the Bafta-winning movie Gravity.

The Avere hardware allowed Framestore to avoid production bottlenecks that occurred near the end of movie production cycles and also allowed it to survive an electrical brownout without ill effect.

Soho-based Framestore, which employs more than 600 artists, developers and engineers, underwent a full revamp of its storage systems to deal with the demands of Gravity. This included deployment of around 1PB of Hitachi Data Systems’ BlueArc clustered NAS as bulk online storage with DotHill SANs behind open source ZFS servers for nearline storage and tape for long-term archiving.

But a key challenge faced by Framestore was dealing with massive demand on the BlueArc storage systems as projects culminated, including large movie files with tens of gigabytes per frame, says CTO Steve McPherson.

“The scenario we face at the end of every production cycle is that the systems get swamped with people working off the servers on sophisticated final renders at full resolution. The first warning signs are when the phone calls start coming that the network is slow,” he says.

Initially, Framestore began testing the Linux open source caching tool CacheFS, but this proved adequate for reads but insufficiently rapid on writes, says McPherson.

He says that in the first stages of the project Framestore rejected Avere. “Why would anyone need this, we thought, and it didn’t help that they sent a sales person and not a technical person to see us,” says McPherson. “But the thing that kept Avere in the running was its [CEO Ron Bianchini’s] history at Spinnaker [a NAS clustering specialist acquired by NetApp], and the more we looked at the problem the more it made sense.”

Eventually, Framestore deployed three Avere FXT 4500 NAS acceleration devices. These cache NAS traffic to speed up access to hot data with multiple devices operating in clustered fashion to give a single pool of storage to all devices accessing them. Each FXT 4500 has 144GB of DRAM, 2GB of NVRAM, 3TB of flash storage capacity and a combination of 10Gbps and 1Gbps Ethernet ports.
Main movie files are initially accessed via Avere and held there while staff work on them, says McPherson. Meanwhile, other staff can work on smaller sub-projects with no disruption of performance either way.

“Avere protects the render farm,” says McPherson, referring to Framestore’s high-performance compute and storage cluster used to create CGI effects. “It extracts sets of frequently used data and isolates them as cache.”

The most extreme test of the Avere cluster’s usefulness came when Framestore suffered an electrical brownout that knocked out most of its systems. “Normally we’d have problems when we fired things up after an event like this,” says McPherson. “But because the working set was there in Avere it went straight to peak capacity and the majority of jobs fired straight back up from cache.”

Is there anything Avere could improve in future versions? Only the cost, says McPherson. “It’s an expensive solution. I imagine if it catches on that the cost might come down, but as it is you have to have a well-defined project in mind to justify it.”

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**Case study: Cancer Research boosts IOPS with EMC XtremSF PCIe flash**

*Winner for the best private sector project*

Cancer Research UK (CRUK) has deployed EMC PCIe XtremSF flash storage cards with benefits.

These include reduced times to run CRM queries, from many hours to a few seconds; regaining huge amounts of IOPS performance from storage arrays, and an expected return on investment within 18 months for the implementation.

CRUK’s main office at Angel, London, has around 1,200 staff, with 5,000 across the organisation as a whole. That site is also its main datacentre, serving key applications, including Microsoft Exchange email, HR apps, financials and Oracle CRM. It has a secondary site 25 miles away in Slough.

Several factors led CRUK to move towards using PCIe flash acceleration in its storage infrastructure; namely that it was time for a storage hardware refresh and the organisation was moving towards physical centralisation of buildings and server and desktop virtualisation.

CRUK’s existing EMC Clariion SAN – a 4480 with around 700TB of capacity in Fibre Channel, Sata and flash drives – was at a tipping point in terms of I/O performance, says head of infrastructure Michael Briggs.

“EMC was running tests and getting stats off the Clariion, which showed it to be very slow,” he says. “They asked us to take it off test and on to production data. They didn’t realise that was its production performance.”

The difficulty with the Clariion was not in terms of storage capacity but its inability to keep up with the required processing power, so as part of the two-site hardware refresh Briggs’s team looked at how to improve CPU performance.

So, while CRUK added a VNX 5500 at its main site, which became the repository for VDI, Microsoft Exchange email and file storage data (and further VNXs – a 5500 and 5300) at the Slough site.

However, the main demands on IOPS performance on the existing storage had come from CRUK’s Oracle Business Intelligence queries, says Briggs. “Marketing queries were causing extreme IOPS demands on the arrays and we wanted to take these peaks away from them,” he says.

So the firm decided to move to EMC’s PCIe flash card offering, VFCache, now rebranded XtremSF.

PCIe flash – or server-side flash – is just one way that flash storage capacity
can be added to server and storage infrastructures. It is attached directly to servers and provides high-IOPS, low-latency caching of hot data very close to the server CPU.

CRUK deployed a 350GB single-level cell (SLC) VFCache card in an HP server and ran a marketing query that normally took five to seven hours. It ran in 18 seconds.

The key benefit to PCIe flash storage, says Briggs, is that massive amounts of IOPS previously clogging up the storage array are now consigned to dedicated flash cache on a server. This not only speeds performance on the flash card but also frees up performance on the array.

“We got about half of a VNX back and that’s worth far more than the cost of a VFCache card,” he says. Meanwhile, the marketing department was able to run three or four more queries per day than they had done previously. “They quadrupled throughput, which was obviously a good business result,” says Briggs.

CRUK has since deployed two more 700GB EMC XtremSF PCIe flash cards. These were also SLC, although now EMC offers the cards with lower-cost multi-level cell (MLC) flash.

“If you target flash correctly it not only pays for itself but gives you a big chunk of your main storage back too,” says Briggs.