WATCHING BRIEF:
Increased surveillance brings new storage challenges

ENTERPRISE SPEED
NVMe delivers data faster

THREE EASY PIECES
Ceph, OpenStack & Hybrid Cloud come together

CHANGE OR DIE?
The unstoppable rise of software-defined storage

PRODUCT REVIEW:
StorMagic SvSAN 5.2
Welcome to a flash-transformed data centre.

Despite lower budgets, the need for real-time access to data has only increased, along with demands on IT. But with SanDisk SAS SSDs and a flash-transformed data centre, you can accelerate price/performance 100x. A win-win solution that benefits everyone. That’s why SanDisk has been expanding the possibilities of storage for over 25 years.

sandisk.co.uk/data

Source: As compared to 1.8TB SAS SSD with 1.8TB Read IOPS performance and published pricing as of January 20, 2015
(SANDISK CORPORATION 2015. All rights reserved.)
Comment.....................................4
SOFTWARE-DEFINED COMES TO THE FORE

News..........................................6
- Royal Veterinary College goes with NetApp
- Unitrends 8.1 released

CASE STUDY:
LANCASTER UNIVERSITY.........10
HDS provides a complete infrastructure solution that covers SAN, NAS and backup environments for Lancaster University, helping them to face data demands that were predicted to increase from 300TB to 4PB within five years

PRODUCT REVIEW......................12
- StorMagic SvSAN 5.2

CASE STUDY: CISL..................16
The University of Cambridge Institute for Sustainability Leadership (CISL) has reduced backup time by 90+ percent while still ensuring business continuity of physical and virtual environments

THREE EASY PIECES.................18
Hybrid cloud, OpenStack and Open Source Storage are three essential jigsaw pieces for the enterprise of the future, argues Jason Phippen, Head of Global Product Marketing at SUSE

STRATEGY: FLASH ADOPTION....20
The "flash everywhere" trend is actually materialising as "flash where it makes economic sense", says George Teixeira, CEO of DataCore

WATCHING BRIEF.....................24
Our increasingly surveillance-heavy society brings with it challenges to storage technology providers, explains Nick Spittle of Toshiba

TECHNOLOGY: NVME..............28
The Non-Volatile Memory Express specification signifies a new age of SSD technology that exposes flash as memory, and unleashes non-volatile memory performance, says Scott Harlin of OCZ Storage Solutions

CASE STUDY: MPC...............30
Major visual special effects company MPC is using Avere solutions to help turn storyboard concepts into billion dollar box office smashes

INTERVIEW: QBS SOFTWARE......32
Storage magazine editor David Tyler speaks to Grant James, General Manager, QBS Software Ltd., about the difficulties of marketing in an increasingly Internet of Things’ world

CHANGE OR DIE?....................34
Predicting the inevitable decline of traditional enterprise storage and the ‘unstopable rise’ of software-defined alternatives

www.storagemagazine.co.uk
@STMagAndAwards
This issue includes a couple of opinion/byline pieces around the topic of software-defined storage and its impact on the IT industry now and into the future. As we went to press we received details of a new survey conducted by DataCore, which suggests that for many organisations, software-defined is becoming a more urgent priority than topics such as Big Data, flash and OpenStack. The survey indicates a level of ‘disillusionment’ among IT professionals with many of these much vaunted technologies.

“This survey sheds new light on how IT professionals approach storage-related innovations,” said George Teixeira, president and CEO at DataCore. “The data reveals that many organisations are moving away from storage functions tied to specific hardware and are deriving real CAPEX and OPEX savings and additional purchasing power by not being locked to particular hardware or being forced to go ‘all new buys’ to modernise their storage infrastructure. It also points out that heavily promoted technologies, such as Object Storage, are more often found at the fringes in pilot programs, where IT is hoping to assess their value.”

It would appear from this survey at least as if software-defined storage and storage virtualisation software are increasingly providing the features that the market is demanding right now - which DataCore summarise as ‘continuous availability, faster performance and higher efficiency’. Over fifty percent of respondents said they expect software-defined storage to extend the life of existing storage assets and future-proof their storage infrastructure, enabling them to easily absorb new technologies. Close to half of respondents are looking to software-defined storage to avoid hardware lock-in from storage manufacturers, while lowering hardware costs by allowing them to shop among several competing suppliers. Operationally, they see SDS simplifying management of different classes of storage by automating frequent or complex operations.

“Two major surprises jump out at you from the findings,” said Deni Connor, founding analyst, SSG-NOW. “The absence of near-term spending on Big Data and Object Storage among the majority of respondents, and the relatively small penetration of flash across these (nearly 500) organisations. Not surprising are the rising levels of investments on software-defined storage initiatives known to offer more immediate payoff.”

Will software-defined storage really have this significant an impact on storage strategies? We’d love to know what you think - feel free to share your thoughts via the email address below.

David Tyler
david.tyler@btc.co.uk
INVOICE MANAGEMENT HAS NEVER BEEN EASIER

EASY INVOICE
Say hello to lower invoice processing costs, better controlled invoice receipt-to-payment times, improved cash flow and robust audit compliance

1. Accelerated processing times
2. Enhanced data quality of posted invoices
3. Better visibility to available cash flow
4. Real-time view of authorisation cycles and reporting
5. Revision-proof storage of electronic invoices
SnapCLOUD is Sphere 3D’s new cloud integrated virtual storage platform, designed to deliver fully-featured enterprise NAS functionality in the cloud. Built on Sphere 3D’s proprietary GuardianOS software architecture, SnapCLOUD extends the flexibility and options for customers to obtain unlimited storage in the cloud while maintaining full compatibility with existing SnapServer and SnapScale enterprise storage deployments. This interoperability between on premise and cloud deployments makes it possible for current SnapServer customers to have a SnapCLOUD instance integrated into their current infrastructure in minutes, enabling hybrid cloud models almost instantaneously.

SnapCLOUD supports critical performance and capacity features like high performance snapshots, replication, and block and file-level access. Its built-in sync and share functionality gives users data access anywhere, anytime on any device without the need for additional third-party subscriptions. Users will be able to purchase up to 32TB of SnapCLOUD storage per image in the Microsoft Azure Marketplace by purchasing 1GB increments on a pay-for-use basis.

www.sphere3d.com

UNITRENDING

Unitrends Release 8.1 is the latest version of the robust data protection software powering Unitrends’ Recovery-Series family of physical backup and disaster recovery appliances, as well as its Unitrends Enterprise Backup virtual appliance. Release 8.1 provides up to 50 times faster backup windows, a new Red Hat Enterprise Linux deployment option and advanced support for VMware vSphere 6. Release 8.1 includes a new changed-block tracking feature for Microsoft Hyper-V environments, and also extends VMware protection to support vSphere 6.

www.unitrends.com

RVC STORAGE IS IN SAFE HANDS

The Royal Veterinary College, part of the University of London and one of the largest and longest-established vet schools in the UK, has chosen NetApp to revamp its data storage infrastructure and drive research in a more efficient manner.

As a leading veterinary college the RVC not only has a large clinical practice, but also undertakes a large body of research. Funded by the likes of Pfizer and other pharmaceutical companies, as well as the UK Research Councils and charities, it leads the way in many areas of research such as bioinformatics and DNA sampling. However, its research also extends into the field and includes projects such as tracking large cats in Africa, the evolution of dinosaur body shape and motion, and reassembling the first animal backbones using a particle accelerator to discover how they evolved.

Following a review of its research volumes and how data is collected and stored, the Royal Veterinary College wanted to establish a more rigorous process to safeguard against the potential loss of important information. The RVC selected the NetApp running the clustered Data ONTAP operating system, with disaster recovery functions across both of its two sites. This solution consolidates SAN, NAS, primary and secondary storage across one single platform. Clustered Data ONTAP manages a set of storage-saving software, including deduplication and snapshot copies. The platform ensures scalability for the 2PB to 3PB of data that the college produces a day. Farukh Zeeshan, Head of IT Infrastructure, RVC said: “The simplified management of NetApp makes it very easy for us to manage our data storage. This management performance is one of the strong points and makes the IT team’s job easier. In fact, the clustered Data ONTAP operating system has helped to revolutionise storage management. Its highly scalable and can go up to 11PB, which is an enormous benefit, is helping our private cloud flourish and is underpinning our future research and growth plans.”

www.netapp.com/uk/

VMWARE VIRTUAL SAN SUPPORT

HGST has unveiled a portfolio of certified devices for VMware Virtual SAN, VMware’s software-defined storage product. These include 12Gb/s SAS solid state drives, PCIe Flash accelerators, as well as performance and capacity hard disk drives (HDD) from the Ultrastar family, including the industry’s only helium-filled HDD product line. Together, these certified devices provide interoperable storage tiers for VMware Virtual SAN.

“HGST supporting VMware Virtual SAN with a broad portfolio of certified devices will give enterprises and cloud data centres an extensive choice to optimally implement their software-defined storage initiatives,” said Gaetan Castelein, senior director, Storage and Availability, VMware. “Storing and managing data are two of the most important functions in the data centre.”

www.hgst.com

OH, SNAPCLOUD!

SnapCLOUD is Sphere 3D’s new cloud integrated virtual storage platform, designed to deliver fully-featured enterprise NAS functionality in the cloud. Built on Sphere 3D’s proprietary GuardianOS software architecture, SnapCLOUD extends the flexibility and options for customers to obtain unlimited storage in the cloud while maintaining full compatibility with existing SnapServer and SnapScale enterprise storage deployments. This interoperability between on premise and cloud deployments makes it possible for current SnapServer customers to have a SnapCLOUD instance integrated into their current infrastructure in minutes, enabling hybrid cloud models almost instantaneously.

SnapCLOUD supports critical performance and capacity features like high performance snapshots, replication, and block and file-level access. Its built-in sync and share functionality gives users data access anywhere, anytime on any device without the need for additional third-party subscriptions. Users will be able to purchase up to 32TB of SnapCLOUD storage per image in the Microsoft Azure Marketplace by purchasing 1GB increments on a pay-for-use basis.

www.sphere3d.com

www.storagemagazine.co.uk

@STMagAndAwards
STORAGE REDEFINED

Less than a penny for 10GB per month!

Build cost-efficient and highly scalable storage using commodity off-the-shelf servers and disk drives with SUSE Enterprise Storage, powered by Ceph. This self-healing and self-managing solution provides you with storage functionality comparable to mid- and high-end storage products at a fraction of the cost. Add capacity at the cost you want to pay and enable your storage administrators to minimize the amount of time they spent managing storage.

Learn more today at www.suse.com/penny
NEW INFOSIGHT

New from Nimble Storage, Infosight is a cloud-connected management and support engine that leverages actionable intelligence through the power of sophisticated data sciences. Integral to the Nimble Adaptive Flash platform, Infosight simplifies management and support with intelligent, analytics-driven automation to preempt issues, maintain storage health, and manage growth.

Infosight provides granular visibility into VMware virtual machine environments, enabling enterprise IT organisations to rapidly resolve resource contention issues and optimise performance. The Infosight deep data analytics engine captures and analyses over 30 million data points collected daily from each one of the thousands of installed-base Adaptive Flash storage arrays to provide comprehensive intelligence into overall storage infrastructure health.

www.nimblescope.com

DATA CENTRED

SanDisk has unveiled a new generation of its Fusion ioMemory PCIe application accelerators to dramatically improve performance, while helping to drive data centre consolidation and lower total cost of ownership. The new Fusion ioMemory PCIe application accelerators, comprised of SanDisk NAND flash, and Virtual Storage Layer data access acceleration software, deliver up to a 4x price performance improvement, with up to a 61 percent list price reduction over the previous generation Fusion ioDrive2 product.

"Combining the power of Fusion ioMemory technology with SanDisk's vertically integrated NAND Flash, our engineering talent and portfolio of SATA and SAS SSDs, provides customers with an unparalleled combination of flexibility, performance, scalability, quality and value to help solve their data centre challenges," said John Scaramuzzo, senior vice president and general manager, Enterprise Storage Solutions, SanDisk.

www.sandisk.com

WHAT'S THE STATE OF PLAY FOR SDS?

DataCore has announced the results of its fifth annual State of Software-Defined Storage (SDS) survey. The 2015 poll explored the impact of SDS on organisations across the globe, and distills the experiences of 477 IT professionals currently using or evaluating SDS to solve critical data storage challenges. The results yield surprising insights from a cross-section of industries over a wide range of workloads. The survey also probed for levels of spending on much-hyped topics, including Big Data, Object Storage and OpenStack.

Unexpectedly, the findings showed that very little funding is being earmarked in 2015 for these initiatives. This may be explained by a number of disillusionments that were disclosed in the findings.

On the other hand, this year's report reveals several major business drivers for implementing Software-Defined Storage. 52 percent of respondents expect SDS will extend the life of existing storage assets and future-proof their storage infrastructure, enabling them to easily absorb new technologies. Close to half of respondents look to SDS to avoid hardware lock-in from storage manufacturers, while lowering hardware costs by allowing them to shop among several competing suppliers.

Operationally, they see SDS simplifying management of different classes of storage by automating frequent or complex operations. These results portray a sharp increase in the recognition of the economic benefits generated by SDS (reduced CapEx), complementing the OPEX savings referenced in prior years.

Other surprises include: while flash technology penetration expanded, it is still absent in 28 percent of the cases and 16 percent reported that it did not meet application acceleration expectations. Also of note is that 21 percent reported that highly touted hyper-converged systems did not perform as required or did not integrate well within their infrastructure.

Then again, SDS and storage virtualisation are deemed 'very urgent' now, with 63 percent of organisations making important investments in these technologies throughout 2015. 81 percent also expect similar levels of spending on Software-Defined Storage technologies that will be incorporated within server SANs / virtual SANs and converged storage solutions.

www.datacore.com/sds2015

AN ARRAY OF SOLARWINDS SUPPORT

SolarWinds has announced enhancements to its newest product, SolarWinds Storage Resource Monitor (SRM), which provides IT with the necessary insight into multi-vendor storage resources and the potential impact on virtual environments to ensure business-critical application performance.

In the latest version, SolarWinds SRM extends the breadth of its multi-vendor storage management by adding monitoring capabilities for the more commonly used EMC, Dell, HP and Dot Hill storage array families to the SolarWinds Orion technology backbone.

SolarWinds SRM provides IT pros with single-pane-of-glass visibility into their storage infrastructure, including:

* Multi-vendor NAS and SAN monitoring, alerting and reporting
* Insight into storage performance across devices, storage groups and LUNs to identify I/O hotspots
* Automatic capacity monitoring and growth forecasting

"By working closely with and listening to SolarWinds' thwack online user community of over 130,000 IT pros, SolarWinds is able to expedite the product release cycle, solving the problems and challenges that specifically address the IT needs of today," said Jennings. "The increased product release velocity ensures IT pros get the right functionality for their changing environment, when they need it, as well as increased value for their investment in SolarWinds products over time."

www.solarwinds.com/uk/
New Storage Device Support – NetApp cluster mode and unified EMC VNX support.

Customisable – Flexible device grouping/reporting/altering/UI resources, custom properties, and performance base lining.

AppStack Dashboard – Manage the entire application stack through the integration with Server & Application Monitor, Virtualization Manager, and Web Performance Monitor.

Get deep visibility into the performance of your multi-vendor storage arrays; EMC, NetApp, Dell, HP and more with SolarWinds Storage Resource Monitor.

Contact us today for this must have application:

QBS Software Ltd,
7 Wharfside, Rosemont Road, Wembley, HA0 4QB, UK

Tel: +44 (0)20 8733 7101 (International)  Email: sales@qbssoftware.com

www.qbssoftware.com/solarwinds
Located on a beautiful campus in the North West of England, Lancaster University places great emphasis on a strong student experience and employability and gives students access to academics who are experts in their field. Lancaster is one of only a handful of universities with a collegiate system which has helped to forge a strong sense of identity and loyalty, and continues to be a distinctive feature of student life at Lancaster. Students from one hundred countries make up a thriving community based around nine colleges, creating a culturally diverse campus.

Lancaster’s community extends far beyond the campus with research, teaching and student exchange partnerships with leading universities and institutions in 24 countries around the world. Now approaching its golden jubilee year Lancaster’s journey has been a remarkable one, and it is now amongst the top one per cent of universities in the world, with an ambitious strategic plan.

The university required a robust, high-quality and scalable storage and backup solution to support its business applications and research data storage for at least the next five years.

The existing infrastructure was approaching full capacity and unable to continue supporting its growing data demands. The NAS environment (provided by EMC) was reaching maximum capacity and did not have a non-disruptive route for expansion of its research data storage. The existing EMC backup hardware had also reached end of life, and the backup window and tape quantity was at the practical capacity limit.

A key requirement for the university was ease of use for the IT team and the end users, more than 30,000 students and staff.

UNLOCKING POTENTIAL

HITACHI DATA SYSTEMS WORKED WITH PARTNER XMA TO PROVIDE A COMPLETE INFRASTRUCTURE SOLUTION THAT COVERS SAN, NAS AND BACKUP ENVIRONMENTS FOR LANCASTER UNIVERSITY. TOGETHER, THEY HELPED THE HIGHLY RATED RESEARCH-LED INSTITUTION TO FACE DATA DEMANDS THAT WERE PREDICTED TO INCREASE FROM 300TB TO 4PB WITHIN FIVE YEARS.
With this number growing every year and presenting ongoing management challenges, Lancaster University required a solution that would accommodate a 25% year on year increase in storage capacity, concurrent connections, and total I/Os to support their virtual server infrastructure. With approximately 90% of the infrastructure virtualised, it was important that any new solution was able to support and be supported by Microsoft Hyper-V and VMware vSphere environments that were already in place. Another consideration was expertise in disaster recovery and backup as the solution needed to support failovers and provide resilience between two data centre locations.

Recent changes in government policy mean that the university is now mandated to retain research data for up to 10 years. Lancaster University needed a single vendor to manage its entire storage estate, including SAN, NAS and backup environments, with the ability to manage a predicted increase of research, personal and departmental data from about 300TB to 4PB over the next 3 to 4 years.

**TWO PHASE MIGRATION**

Hitachi Data Systems along with partner, XMA, utilised the National Server and Storage Agreement framework to provide a solution for Lancaster University that covered SAN, NAS and backup environments.

Migration was completed in two phases, and two separate NAS platforms were proposed for each main data type: user and research data. For research data, concurrent users, number of open files, and edits to files are retained for decades with a multiple petabyte capacity. User data is only retained for a few years and has a maximum capacity in the hundreds of terabytes.

For cost efficiency, Lancaster University’s user data is now stored in Hitachi NAS Platform (HNAS) with intelligent tiering based on access frequency. To ensure scalability and reliability, research data is stored in a virtualised Hitachi Content Platform (HCP). HCP is ideal for the management of business-critical information and utilises Hitachi Unified Storage (HUS): HUS 150 via HUS VM. To provide a high-performance gateway and ensure fast file retrieval and additions, research data is presented via HNAS to users with Hitachi Data Ingestor (HDI) across the two data centre locations.

With the university’s current environment composed of about 90% virtualised infrastructure, the optimal solution was to consolidate all data into the virtualised HUS VM, a competitive, cost-effective solution that delivered flexibility and scalability. Best-in-industry capabilities were installed across all areas using HNAS and HUS 150, with backup-free architecture put in place for high-performance NAS research data using HCP.

“Growth in demand for storage at Lancaster University is accelerating rapidly,” commented Dr. Matthew Storey, systems technical coordinator, Lancaster University. “Forecasting our future data requirements is difficult, and particularly challenging when it comes to research data. We are confident that the Hitachi Data Systems solution has provided us with a reliable, future-proof infrastructure, designed to scale with us as we grow.”

**EXCEEDING REQUIREMENTS**

Hitachi Data Systems with partner, XMA, delivered a solution that provided Lancaster University with high-performance, resilient technology to meet the storage needs of today and scalability demands as the organisation grows.

Upon installation of the HDS solution, a benchmark test proved its high-performance capabilities, superseding IOPS requirements by 250%. The difference was highly notable as end-user services greatly improved, allowing students, faculty members and administrative staff to work more efficiently, access required services, and maximise use of the research data produced by the university.

Due to virtualisation and advanced flash technology, Lancaster University has accelerated application performance and reduced costs. The university also manages capacity and services more efficiently. To meet government guidelines, data retention was important and Lancaster now has the flexibility to support its projected data growth over the coming years.

The university’s commitment to energy efficiency was also at the forefront of the solution design. For example, HCP and HDI servers were virtualised into the existing VMware vSphere platform to reduce floor space and power usage in the data centres. Hitachi Command Suite allows the university to predict and forecast change and plan for impact without compromising service levels. Hitachi Dynamic Tiering software helps simplify storage administration and minimise costs for NAS storage. Backup windows were also reduced by 80%, as well as the need to back up research data.

“We had come to a natural end with our existing infrastructure and wanted to be much more forward-thinking in how we approach data. Hitachi Data Systems came to us with a proposition that not only simplified and optimised our IT, but also delivered a platform that gives our students the ability to go deep into the archives and collaborate much more effectively than before,” said Dr. Matthew Storey, systems technical coordinator, Lancaster University. “Our new infrastructure holds even more capabilities which we’re still actively looking to exploit, particularly concerning unlocking research insights from the data we hold as an organisation.”

More info: www.hds.com
STORMAGIC SVSAN 5.2

Software defined storage is the way forward for enterprises that will not tolerate any downtime for their business critical applications. StorMagic’s SvSAN is an ideal solution for distributed environments as it pushes storage resiliency to the network edge but without the high costs associated with many of today’s hardware products.

SvSAN allows businesses to create high availability IP SANs on virtual storage appliances using nothing more than VMware or Hyper-V hosts. Internal and external direct-attached storage hardware are both supported and it doesn’t lock you into a vendor’s proprietary hardware as you can use any industry standard servers you want.

The latest SvSAN 5.2 on review delivers a wealth of new features with write back caching using high-performance SSDs as staging areas for increased I/O throughput. Storage pools can be transparently migrated to other locations and expanded on demand into new storage space.

Performance monitoring has been enhanced to provide granular historical statistics on throughput. Per-target reporting now allows users to easily identify bottlenecks and monitor storage usage trends. StorMagic has also released a management pack and system management provider for Microsoft’s System Centre Operations Manager (SCOM) allowing enterprises to centralize and monitor all SvSAN deployments from a single console. This can scale to thousands of remote installations and provides real-time alerting for swift problem alerting and diagnosis.

The minimum hardware requirement is two servers which StorMagic uses to create synchronously mirrored storage pools. It can scale easily beyond this two server model and uses active-active mirroring across its VSAs (virtual storage appliances).

Using standard Dell PowerEdge servers running the Hyper-V role, we found SvSAN a cinch to deploy. The SvSAN importer wizard led us swiftly through creating new VSAs where we selected the physical storage and network interfaces we wanted it to use.

SvSAN employs load balancing between cluster members and the recommended deployment is to create a dedicated back end network between the servers for this function. It’s easy to achieve as we created additional Hyper-V virtual switches which were assigned to mirroring tasks.

Performance can be easily boosted by adding more back-end connections. With one Gigabit link, you’ll see around 110MB/sec throughput and adding a second link doubles this. SvSAN also reduces networking costs as it doesn’t require additional switching gear.

Storage choices are extensive as SvSAN supports all standard SATA and SAS drives along with SSDs. The latter can be added as write-back caches on demand and all I/O is directed to them first where it remains until overwritten.

Many competing products require a minimum of three nodes to provide full data integrity in the event of a mirror failure. StorMagic has a far more cost-effective solution as its Neutral Storage Host (NSH) runs on a separate system and acts as a quorum service which can be shared between thousands of locations.

It creates a logical triangle between itself and the VSAs and ensures that if a host goes down or a WAN link fails, the remaining storage nodes will continue to function. NSH neatly avoids the dreaded mirror ‘split-brain’ syndrome and is so small it can exist unobtrusively on any Windows or Linux host or in its own VM.

Product: SvSAN 5.2  
Supplier: StorMagic  
Tel: +44 (0) 117 952 7390  
Web site: www.stormagic.com

VERDICT: During our testing we found StorMagic’s SvSAN remarkably easy to manage and capable of delivering zero downtime for critical storage. It provides an elegant and highly cost-effective resilient storage solution ideally suited to deployment in remote locations such as ROBOs and even in the field.
Reliable data storage is the lifeblood of any enterprise. So why trust your data to anything less than the most trusted, most reliable drives from the most experienced manufacturer? Toshiba invented NAND flash storage, and have millions of drives installed worldwide. From HDDs to SSDs, and 3.5” to 2.5”, when you need high-capacity, high-performance storage solutions for the heart of your enterprise, your head says Toshiba.

For more information visit [www.toshiba-storage.com](http://www.toshiba-storage.com)
Desktop Virtualisation (VDI) is a way of accessing desktops running remotely in a data centre by using a protocol. There are many vendors in this space providing various solutions but two consistent factors when considering VDI solutions are network and storage. These two areas perfectly illustrate the evolution of VDI and show how flash plays an important role in VDI solutions, which is discussed in more detail below.

**VDI EVOLUTION**

The evolution of VDI can be categorised into three different phases:

**VDI 1.0**

This was an early stage and basic approach to VDI, which was not broadly adopted by enterprises. Companies were familiarising themselves with it as a solution and, as a result, kept VDI to non-critical applications. The adoption was mostly for call centre applications virtualising one application per desktop. At this stage, the footprint and configuration of the desktops were fairly small so running a few desktops (Virtual Machines) in a data centre did not consume many resources (computing, storage and network).

In these deployments, there were no huge storage IO, throughput or latency demands. HDD / spinning media storage was often good enough to serve the user need and experience. However, VDI 1.0 was the first attempt to apply breakthrough virtualisation technology to desktop computing, although the average desktop VM costs were similar to those of server workload VMs.

**VDI 2.0**

With the initial success of VDI 1.0, enterprises started to consider VDI for more mission-critical applications requiring better performance and reliability. With the advent of solid-state drives (SSDs), the storage IO and throughput demands increased significantly. SSDs offered much faster access times and lower latency compared to HDDs, making them suitable for high-performance applications. This led to the development of VDI 2.0, which focused on optimising the storage infrastructure to support high-performance applications.

**VDI 3.0**

As technology continued to evolve, the storage requirements for VDI further increased. The emergence of enterprise flash storage systems allowed for even faster access times and lower latencies. VDI 3.0 leveraged this technology to provide better performance and efficiency, enabling enterprises to run more demanding applications on desktop virtualisation systems.

**ENABLING THE NEXT STAGE IN VDI**

Flash is playing a key role in the development of desktop virtualisation, says Marcos Burnett, Sales Director for Northern Europe, Sandisk.
"Two years ago, it was beyond imagination to think of virtualising such monster workstations (engineering and design). However, this is becoming reality. In fact, it is possible do this to a great extent already today using flash. Without flash storage, such implementations would not be possible."

**VDI 2.0**

This is the current generation of VDI which started about two to three years ago and will likely continue for a few more; along the way becoming the baseline for next-generation VDI. The reason behind its prominence was the evaluation of VDI 1.0 by enterprises and the realisation of the benefits it offered around security, accessibility, flexibility and manageability compared to physical desktops. This led to the adoption of VDI becoming more mainstream, with organisations adopting more types of users alongside many applications. However, this created problems at the infrastructure layer, such as boot storm, desktop patching, fast deployment, and user experience.

From a storage perspective, these issues resulted in thousands of IOPS becoming a de-facto standard for these desktops and magnetic media was unable to cope with these new I/O demands. There were attempts to optimise storage performance by using a SAN consisting of 100s of magnetic media. But such solutions are neither cost-effective nor efficient as VDI demands different types of IO. There is an adoption of all-flash arrays in this space, which is quite successful, but cost is still a concern.

New architectures helped organisations to adopt hyper-converged solutions (bringing storage and compute together) where flash storage is a default element that enables to address the storage performance needs. Some solutions use flash for caching, while in other solutions the entire storage stack is designed using different types of flash storage based on the application need e.g. VMware All Flash Virtual SAN. Enterprises are now either adopting all flash and/or partial flash deployment using this hyper-converged approach.

To summarise, VDI 2.0 expanded the scope of desktop types, while delivering acceptable end user experience. Using innovative infrastructure approaches, enterprises have been able to keep the average cost per desktop lower than before.

**VDI 3.0**

As VDI 2.0 continues to be deployed in enterprises and becomes more common, high-end workstation virtualisation evaluation and proof of concept (POC) have also developed. There are a lot of commonalities that exist between VDI 2.0 and VDI 3.0, in fact many of VDI 3.0 aspects are back-porting to VDI 2.0 and improving user experience. Flash is having a key role in shaping this development.

There are two elements that seen as unique to VDI 3.0 virtualisation: all-flash storage deployment for desktop capacity and performance, and the element of "graphics" in addition to the existing compute, network and storage. With the inclusion of graphics, storage is becoming even more critical from a deployment perspective. These two elements are not only helping users of VDI 2.0, but expanding the opportunity to include high-end desktops such as engineering or design workstations. Two years ago, it was beyond imagination to think of virtualising such monster workstations. However, this is becoming reality. In fact, it is possible do this to a great extent already today using flash. Without flash storage, such implementations would not be possible.

Furthermore, storage data services like de-duplication, thin provisioning and compression help keep average desktop costs very competitive even when using all-flash storage deployments. VDI 3.0 promises to offer to the most challenging desktop use cases acceptable performance and competitive costs.

In summary, VDI is going to be deployed more and more to help companies gain cost and management efficiencies and flash storage will be necessary for its success. At present, there are many hardware and software solutions addressing VDI 2.0 and VDI 3.0 needs but its two central pillars of network and storage still remain the same.

More info: [www.sandisk.com](http://www.sandisk.com)
The University of Cambridge Institute for Sustainability Leadership’s (CISL’s) data backup is now nine times faster with Arcserve’s Unified Data Protection software - with backup times reduced from 18 to just two hours. The Institute’s virtual servers are also now continuously available and a multi-layered recovery approach means crucial data is always on hand.

CISL works with future leaders: helping them develop the skills they need to tackle critical global challenges. Through education programmes, business platforms and strategic engagement initiatives, the institute deepens future leaders’ social, environmental and economic understanding.

The Institute selected Arcserve UDP to accelerate backup times, increase availability and speed up its data recovery. Combining backup, replication, high availability and true global de-duplication technologies within one unified console for virtual and physical systems, Arcserve UDP’s solution also offers advanced recovery capabilities and unmatched ease-of-use.

CISL has used Arcserve’s backup solutions since before 2007, beginning with tape backup, then moving to disk-to-disk. But demands on the Institute’s storage system have increased: its IT system has virtualised and volumes of data continue to grow. The Institute holds 2.5TB of data, a large amount of which is sensitive, and needs to be readily available at all times. It is therefore essential that its 23 virtual and physical servers are running smoothly and are well protected to ensure business continuity.

By modernising its backup and recovery strategy with Arcserve UDP, CISL has been able to:
- Ensure the availability of information for staff and stakeholders
- Prevent any disruptions due to slow backups
- Safeguard its reputation with future leaders by improving its ability to recover server data

CISL’s newly-deployed Arcserve UDP allows offline backups for an extra layer of protection. CISL is now able to recover data from remote sites where a tape autoloader is located. Monthly backups to this target offer further peace of mind.

The IT team at CISL, led by IT manager Ellis Karim, was keen to address the institute’s rapidly growing volumes of data, which were impacting business performance: overnight tape backups for example took more than 18 hours. Furthermore, the institute’s existing LTO 4 tapes could only hold up to two weeks’ worth of data - equalling around 1.5TB - meaning that older files had to be recovered from tape, which was disruptive and time-consuming.

With limited internal IT resources, the institute needed to find a single, comprehensive and easy-to-manage automated backup and recovery solution, a scalable product that would reduce the need for tape backups and offer the same, if not better, level of data protection.

Now Arcserve UDP protects data across one physical server and 22 virtual machines running on three Citrix XenServer hosts. A total of 2.5TB of data is backed up including SQL server databases, Microsoft Exchange mailboxes, Microsoft Office files and a CRM system.

Every night Arcserve UDP automatically carries out incremental backups across CISL’s virtual and physical servers, and during the day, file, email and database servers are backed up every four hours, with each backup taking just ten minutes - a task that previously took up to twenty-two hours.

Arcserve UDP has also reduced the need to backup to tape as it gives up to 90 days of incremental backups, meaning that Karim and his team rarely need to go back to tape: “Arcserve UDP automates the whole data protection process. After completing the incremental backups, it creates virtual standby servers at a remote site and then replicates the data to the university’s main data centre. All we need to do is monitor the process”.

More info: www.arcserve.com
iomart
The Original Cloud Company

OUR CLOUD • YOUR WAY
Compute - Network - Storage - Security

0800 040 7228

www.iomart.com
Many - if not most - major enterprises are experiencing enormous increases in the demand for storage and computing power. Few, if any, will have the budget to meet rising requirements that continue to outpace the growth in their budgets. This raises a difficult question for IT teams everywhere: how long is the usual approach of managing the install, upgrade, retire and replace cycle going to work?

By now it should be obvious to all that the strategy that the built the data centre of the past isn’t going to deliver the data centre of the future. New models and approaches are being embraced by the hyperscalers based on open source software and commodity hardware. Cloud, we are told, has made IT a utility - as simple and as easy to manage as your gas bill. Yet, while we all know there are many advantages to paying by OpEx over CapEx, over time cloud can mean paying more - just in smaller instalments.

As the changes come through there is considerable risk for IT teams, who will need to be at pains to squeeze every penny from existing investment, make sound choices with new ones, and wisely navigate the gap between vendor marketing messages, analyst hype and reality.

In this foggy world, some things are crystal clear:

1. Outside of the ‘hyperscalers’ hardly anyone will be able to afford to own and host all their compute power on premise. In the future a proportion of your compute power is going to be in public clouds, one way or another, sooner or later.

2. Storage growth is massive, unsustainable, and you are going to need to find a better, cheaper way of doing it, and that way is going to need to work in harmony with your compute decisions.

3. Vendor lock-down is never a good idea. In a world where business models change, discovering you’re locked into a cloud provider might well be one of the most unpleasant discoveries of your life.

Three things you can do about it:

1. Hybrid cloud
Analysts IDC have named hybrid cloud one of the biggest IT trends for 2015, forecasting that by the end of the year more than 65% of enterprises world-wide will commit to hybrid cloud.
"Cloud, we are told, has made IT a utility - as simple and as easy to manage as your gas bill. Yet, while we all know there are many advantages to paying by OpEx over CapEx, over time cloud can mean paying more - just in smaller instalments."

Hybrid cloud provides a close connectivity between physical and virtual systems inside the enterprise and those provided by the likes of Amazon, Google, and Microsoft Azure. Integrating public and private clouds allows data, services and workloads to be moved at the flick of a switch, with the administrator able to monitor and manage the whole set up via a single pane of glass.

Sensitive data like corporate IP can kept inside the company firewall, and the enterprise can access additional processing power during seasonal peaks like Christmas, without the expense of massively scaling up hardware. If you’re moving towards or deploying big data analytics, or your organisation experiences any kind of seasonality, you are unlikely to have the necessary power in-house in the long term, and so you’re going to go hybrid.

However, whilst the concept is easy to understand, cloud computing platforms often don’t interoperate well, and moving data from one proprietary cloud to another or from a private cloud to a public cloud can be a surprisingly difficult and expensive process: Amazon Glacier looks like the ultimate cold store, and the eye-catching promise of $0.01 per GB is absolutely correct, but when you factor in the bandwidth charges then should you wish to retrieve or move that data the attraction fades.

2. Investigate how OpenStack can help you avoid lock down

If you’re going to avoid vendor lockdown you are going to need to be able to move data from one provider to another and seamlessly integrate public and private environments. If you are going to compare prices between different providers and work with the partner providing the best mix of service and price, then you are going to need open standards or you will be locked down without an exit plan. OpenStack meets these requirements.

Originally created by Rackspace and NASA in 2010, OpenStack is an open source cloud software platform supported by hundreds of vendors, including some of the biggest names in tech: HP, Intel, Dell, and IBM to name a few. The wide support has made for open APIs designed to be as platform agnostic as possible scaling over a multitude of different environments. OpenStack is compatible with public cloud offerings from Amazon EC2 and S3 - and (with a little effort) AWS and Google Compute Engine; this is why it’s in use with firms like Ebay, PayPal, & Cisco, and a the famous CERN research centre. It makes sense to manage your clouds with OpenStack.

3. Choose Ceph for enterprise storage and get your costs under control

Ceph began life in 2004 as the brain child of Sage Weil: a college dissertation in support of his PhD in Computer Science at the University of California Santa Cruz. On completing his master’s degree Weil started his own hosting company, but had struggled with the cost of proprietary storage. With the support of a grant from the US Department of Energy, Weil went back to school at the University of California and set out to create his own storage platform, a platform with no single point of failure, self-healing, replicated to make it highly fault tolerant, and scalable to the exabyte level. Over the next decade, through a number of commercial iterations, and with support from the open source community, Weil succeeded.

At the heart of Ceph are CRUSH and RADOS. CRUSH: Just as with any distributed file system, files placed into a Ceph cluster are ‘striped’ so that consecutive segments are stored on different physical storage nodes using CRUSH - Controlled Replication Under Scalable Hashing, a hash-based algorithm that calculates how and where to store and retrieve data. CRUSH allows clients to communicate directly with storage devices without a central dictionary or index server to manage object locations, thus enabling Ceph clusters to both store and retrieve data very quickly and access more data concurrently, thereby improving throughput.

RADOS: file block and object storage in a single platform: the Reliable Autonomic Distributed Object Store, provides applications with object, block, and file system storage in a single unified storage cluster. This makes Ceph flexible, highly reliable and easy to manage. RADOS enables vast scalability - thousands of client hosts or KVMs accessing petabytes to exabytes of data. All applications can use the object, block or file system interfaces to the same RADOS cluster simultaneously, meaning Ceph storage systems can serve as a flexible foundation for all of your data storage needs.

BUILD YOUR OWN

Using Ceph, you use ‘white boxes’ - whatever commodity x86 hardware you choose (or even your older end-of-life storage arrays). Because you are free to use commodity hardware and whatever you have to hand, you can avoid being locked into proprietary platforms and all the costs that entails: going software-defined on Ceph can generate cost savings of up to 50% - and for today’s hard pressed storage administrator, that’s something that has to be investigated.

More info: www.suse.com
Flash seems to be finding its natural place in the storage stack and is now gradually being reconciled with existing disk technologies. The ‘flash hype cycle’ seems to be slowing to a more realistic pace, noted largely through the resultant consolidation of flash manufacturers. This necessary market consolidation illustrated that flash, whilst recognised as a worthy game changer, needed to be used as a more practical technology that could be reconciled into existing disk technologies.

Indeed, flash has materialised as being excellent for specialised workloads that require high speed reads such as databases, but it is not largely a cost-effective solution for all workloads and still makes up a very small fraction of the overall installed storage base. On the other side of the spectrum, low-cost SATA disk drives continue to advance and use new technologies like helium to support huge capacities, up to 10 TB per drive, but they are not highly performant and are comparatively slow. We were lulled into believing that customers will shift 100% to ‘all flash’ utopia, but in reality, it is not practical due to the costs involved, and the large installed base of storage that must be addressed. What seems to be missing is the smart software to help unify the new world of flash with the existing and still evolving world of disks.

The market for SATA drives, due to their low cost, has not slowed down and there is a need to balance both flash and SATA technologies to get the most out of an enterprise’s storage investment and effectively utilise all its storage resources. Each flash vendor is trying to create a stack of flash services, but they are starting anew, which is preventing many of them from going to the next level since they don’t have competitive differentiation.
Making Virtualisation Easy.

Tegile’s Intelligent Flash Arrays make virtualising your desktop infrastructure easy. Think And not Or, when it comes to delivering on the promise of desktop virtualisation while keeping storage infrastructure costs down.

www.nceurope.com/Tegile.html

#thinkandnotor
POOLING RESOURCES

Here’s where established and dedicated third party software-defined storage can look at both technologies simply as containers of data, and can apply a comprehensive suite of storage services on top of either flash or SATA drives. For instance, DataCore provides the most powerful enterprise-class flash stack in the industry, as it is easy to create a shared storage pool out of the internal flash and disk storage resources available to a server or to integrate flash or disks that are located externally.

In effect, software-defined storage can integrate and optimise any flash-based technology and disk-based devices as part of virtual SAN deployments or within an overall storage infrastructure. Software-defined storage can reconcile both worlds, and I see software as key to the unification of existing and new disk and flash technologies.

THE WRITE PROFILE

To further the point, look and see what’s happening with SATA drive acceleration. Responding to our customer needs, DataCore is the first to provide a new random write accelerator for SATA drives. Again, flash is good for reads but not effective for write traffic, and SATA is much lower cost but slow. Write-intensive workloads include RAID-5 systems and critical transactional applications like databases, SharePoint, ERP, and on-line transaction processing. The Random Write Accelerator yields up to 30 times faster write performance for random-write-heavy workloads. The write performance speed-ups are most pronounced on SATA disk drives, where each write incurs significant rotational and seek delays to mechanically update blocks on spinning platters. This enables flash-like speed out of these lower-cost devices. Obviously, write-intensive workloads using flash also go faster.

ISLAND LIFE

Also, be aware of the creation of disparate islands. Each flash device has its own unique feature stack, but what happens when they need to work with others? These disjointed software stacks create ‘isolated islands of storage’; everything we have struggled to move away from in the past decade. Virtual SANs, converged systems, and flash devices have continued to proliferate, creating more separately managed machines and ultimately resulting in discrete islands of storage in the IT organisation.

The system administrator can easily provision capacity, maximise utilisation and set high-level policies to allow the software to dynamically select the most appropriate storage tier and paths to achieve the desired levels of performance and availability. Only then will we be able to consider the true value that flash will play in the IT infrastructure of the future.

REALITY CHECK FOR FLASH

Just how accurate is the adoption of the all flash data centre? In our recent Global survey of 500 IT professionals conducted in April 2015, more than half of the respondents (53 percent) said that they currently have less than 10 percent of capacity assigned to flash storage. The number of participants who answered that flash makes up higher than 40 percent of their storage capacity is only 9 percent. Other reality checks for the all flash camp was that while flash technology penetration expanded, it is still absent in 28 percent of the cases and 16 percent reported that it did not meet application acceleration expectations.

More info: www.datacore.com

THE EUROPEAN DATA CENTER TRANSFORMATION EVENT

2 DAYS | 90+ SESSIONS | 130+ SPEAKERS | 120+ EXHIBITORS | 2500+ ATTENDEES

#DCD2015

www.datacenterdynamics.com/europe

REGISTER NOW
20% discount for Storage magazine readers - quote ‘ST15’
Video surveillance is big business. According to research by Transparency Market Research, the total video surveillance and video surveillance-as-a-service (VSaaS) market is expected to reach a value of US$42 billion by 2019, with a compound average growth rate (CAGR) of 19.1% from 2013 to 2019.

With the growing popularity of video surveillance for monitoring industrial processes where human observation could be potentially hazardous, the monitoring of traffic to help emergency services and alert transport safety officers to incidents as well as numerous applications in retail environments, there is an increased demand for storage devices. The surveillance industry continues to transition from analogue data capture and storage on VHS-style tape-based systems, towards digital data capture and storage on HDD-based systems. With the introduction of IP-based video surveillance systems that generate high quality video storage demand have become more acute. Transparency Market Research predicts the total IP-based video surveillance market will grow rapidly between 2013 and 2019 with a CAGR of 24.2%.

With historical surveillance footage becoming increasingly important due to legislation, data is being stored for longer and longer. In combination with the increasing quality of video being collected, storage of surveillance data is becoming a real challenge.

In a similar manner as the migration of general data storage to the cloud, VSaaS has started to emerge as an alternative to local storage and involves the management and archiving of video footage captured by IP-based surveillance cameras on cloud-based storage.

Figure 1 depicts the main types of storage architectures currently in use, highlighting the main storage systems (analogue audio video recorders (AVRs), digital video recorders (DVRs), network video recorders (NVRs) and IP-based storage area networks (SAN)).
TECHNOLOGY: SURVEILLANCE STORAGE

DRIVE FOR PERFECTION
The HDD is the central data storage component of digital surveillance systems. Innovations in speed, capacity and interfaces have dramatically reduced HDD cost per gigabyte and enable HDDs to handle large amounts of data very quickly.

One potential shortcoming of HDDs is the reliance on mechanical moving parts that come with some risk of failure. While solid state drives (SSDs) offer an appealing alternative in terms of speed, resilience and no-moving parts, they are more expensive than HDDs and not yet a viable alternative to systems generating large volumes of surveillance data.

In order to increase the throughput performance and reliability of HDD-based systems, multiple HDDs can be used in what is known as a RAID array. RAID provides redundancy by storing data on multiple drives, ensuring that any single drive failure does not stop the storage system working and that no data is lost.

There are various ways that RAID setups can work, with RAID levels 5 and 6 most commonly being used for surveillance systems as they provide a balance between data redundancy and total capacity needs.

SOLVING THE STORAGE CHALLENGE
As shown in Figure 1, the most suitable type of storage system depends on the number of cameras and the quality of the surveillance data recorded.

For smaller surveillance systems using between one and four cameras, standard storage systems such as AVRs and lower-end NVRs are the most suitable type of storage available. For systems featuring between four and 32 cameras, NVRs and entry-level SAN systems are most applicable, whereas for systems featuring more than 32 cameras, large SAN systems come into play and here cloud-based, enterprise storage arrays are suitable.

The HDDs used in each of these systems need to be optimised for the specific application, however they all need to be high capacity drives, that are power efficient, quiet and are suitable for use in RAID / multi-HDD systems.

Recently, HDDs with capacities of 5TB have been launched, and customers now have the flexibility to retain higher resolution surveillance video data for longer periods using fewer HDDs, helping to maintain a smaller storage footprint and lower energy costs.

Designed specifically for mid-range systems featuring between four and 32 HDDs, Toshiba’s MD04 series drives support up to 32 high definition cameras and provide 24/7 operation. The 5TB capacity provides customers with the flexibility to retain higher resolution surveillance video data for longer periods using fewer HDDs, helping to maintain a smaller storage footprint. The drives are more power efficient than competing higher RPM models and achieve read/write power consumption levels of just 6.5W and stand-by power consumption of 0.7W, helping to reduce the energy costs of surveillance systems.

The low spin, SATA-2.6/3.0 compatible drives feature 128MiB FIFO ring buffer and also incorporate rotational vibration (RV) sensors, making them suitable for use in RAID / multi-HDD based surveillance platforms. When multiple HDDs are mounted in a common chassis, rotational vibrations caused by numerous HDDs spinning have the potential to affect the positional performance of the actuators in the HDDs.

Rotational vibration sensors provide a mechanism to sense these disturbances and provide a feedback mechanism to the actuator in the HDD countering the rotational vibration, improving the performance under these conditions.

SURVEILLANCE IN THE CLOUD
For cloud based surveillance storage systems, high capacity and rotational vibration sensors are still critical. However, speed performance needs to be increased to cope with the added workloads caused by large numbers of cameras writing data simultaneously to a storage system.

In cloud systems high reliability is a key component so that less mirroring is needed and therefore total capacity and system footprint can be kept to a safe but effective minimum. To meet these needs, Toshiba has developed the MC04 series Nearline HDDs that are available in capacities of up to 5TB featuring persistent write cache technology protecting data in the event of unexpected power loss.

The drives support the industry-standard use-case workload rating of up to 180TB per year, more than three times the industry-standard workload rating of desktop class HDDs. The drives minimize read/write power consumption of just 11.3W. The 5TB drives achieve sustained data transfer speeds of 170MiB/s.

THE BIG PICTURE
With an ever-increasing number of surveillance cameras producing higher quality video, data storage needs are growing rapidly. Combined with the desire to keep data for longer periods of time and space constraints that dictate small system footprints, the need for high capacity HDDs is increasing at a phenomenal rate.

Cost-effectively meeting the rigorous demands of surveillance systems, operating around the clock demands reliable high capacity HDDs from Toshiba that ensure high performance while minimising power consumption and noise.

More info: www.toshiba.semiconductor-storage.com

www.storagemagazine.co.uk @STMagAndAwards
Chase Solutions is a successful field services company based in Blackburn, Lancashire that works with utility companies, banks, debt purchase companies and debt collection agencies across the UK to contact and then help customers who are struggling to pay their bills. Established 15 years ago the company describes its services as 'to engage with customers where traditional letter and telephone strategies have been exhausted.' This could be for a multitude of reasons not just debt related.

Chase Solutions’ field agents will visit the customer and establish why they haven’t been in contact with its client. Together with the customer and the client Chase’s agents then assess the customer’s circumstances and where debt-related their ability to pay, and look to set up an affordable repayment plan.

The company boasts a large network of freelance and self-employed field agents with about 600 of them working regularly and more than 70 of them on full-time contracts, all using Chase’s bespoke state-of-the-art handheld technology which audio records each visit. There are about 30 full-time staff based at its headquarters.

Chase Solutions turned to cloud company Iomart because it wanted a flexible hosted desktop solution that was fully compliant with the exacting data standards required by its biggest clients and regulators. Chase works with most of the utility companies in the UK and has just expanded into the Irish Republic and Northern Ireland, with an office being opened in Belfast in the summer. While it was keen to move to a hosted desktop solution to enable its management to work better ‘on the road,’ it was also mindful of the need for continuing security and compliance to meet the strict legal and compliance guidelines of its clients.

Michael Wolfenden, Director of Operations for Chase Solutions, says: ‘A hosted desktop is the perfect solution...
"You hear stories in the media of data going missing because someone's lost a laptop but that can't happen with our hosted desktop solution from iomart. All Chase's clients' data is stored securely at iomart's data centre and because no data is stored on the laptops the regional managers are using, they don't have to be encrypted. Hosted desktop from iomart ticks all the boxes for compliance."

because it allows our management to work on the road without having any important data held on their devices. In addition to being able to securely set up offices in Belfast and London we have been able to recruit key members of the team such as our Head of Field Operations Ricky Donnelly, who is based in London. The whole solution is hosted in iomart’s cloud, in their fully compliant and accredited data centres.

The laptops used by the regional managers have a minimal operating system based on Linux that is securely configured to only allow access to the cloud environment via thin client software VMware Horizon. Being thin client means that only screen images, keyboard and mouse instructions are transmitted between the laptops and the cloud. No data leaves the iomart data centre and therefore there is no risk usually associated with laptops and data stored on their internal drives.

Steve Riley is the IT consultant for Chase Solutions. He is responsible for the IT systems that Chase uses and was instrumental in the move to hosted desktop with iomart. Steve says: "You hear stories in the media of data going missing because someone's lost a laptop but that can't happen with our hosted desktop solution from iomart. All Chase's clients' data is stored securely at iomart's data centre and because no data is stored on the laptops the regional managers are using, they don't have to be encrypted. Hosted desktop from iomart ticks all the boxes for compliance."

As a result of moving to hosted desktop Chase Solutions says its management team has much better control and visibility of its IT system. "It means that when Chase responds to a tender for work we can tick every box with regards to security," Steve explains.

iomart’s VMware-based hosted Virtual Desktop Infrastructure (VDI) delivers desktop services and data direct from its fully-owned and secure data centre infrastructure. Users can be provisioned in seconds and can be scaled up or down as required, removing the headache normally associated with changing head counts and office moves. Agile and responsive IT means that the workforce can access their business applications anywhere at any time.

Hosted desktop is important for business continuity as well because it removes the data from the local hard drive and secures it in data centres where it is backed up regularly. Bill Strain, CTO at iomart, explains: "There are a number of advantages to hosted desktop around cost efficiencies, monthly billing and the mobility and flexibility of your workforce but I think one of the biggest benefits is that you can entrust your IT to a specialist. By using an established cloud services provider that owns and manages its data centres and operates them to strictest security standards you can be confident that your data, the lifeblood of any business, will be managed and protected properly."


The Director of Operations for Chase Solutions, Michael Wolfenden, concludes by saying that the whole company has benefited from the move to the cloud-based hosted desktop solution. "Because we make our money by our agents knocking on doors it's really important that our regional managers have external visibility of the system on the road," he says. "If they stop at a McDonalds or a service station, or if they're meeting field agents in remote locations, they need to have the tools there and then to do the job and be compliant."

According to IDC and its ‘Worldwide Big Data Technology and Services’ research, digital data will reach eight zettabytes in 2015 and forty zettabytes by 2020. With this amount of data generated and accessed, the performance requirement from storage devices has significantly grown. Archaic storage devices, such as spinning disks or hybrid storage, suffer through severe I/O bottlenecks that greatly hamper applications and services. Hence, flash based solid state storage adoption in data centres and cloud services is on the fast track.

With an ever-growing gap between application performance requirements and hard disk drive (HDD) capabilities, PCIe-based SSDs are becoming highly desirable and represent a fast-growing multi-billion dollar global opportunity over the next five years. At present, PCIe SSD deployments are at an adoption stage (see Figure 1), but forecast is to achieve an estimated 2.75x growth in units shipped over the next 5 years according to TrendFocus market research.

To achieve these forecasted deployment levels, new technologies must be developed that standardise and unify the storage stack, eliminate the existing proprietary driver model, and create a serviceable package.

REVOLUTION IN THE DATA CENTRE

Up to now, most SSDs are using a SATA-, SAS- or PCI-Express-Bus interface to connect with the PC system. In down-market the SATA interface for SSDs was the most common, although it was originally developed for mechanical HDDs and therewith not as powerful as needed for high performance SSDs. SATA became the bottleneck for the SSD performance.

Opportunities continue to unfold in the enterprise for flash-based solid-state storage as it provides faster I/O performance than hard disk storage, supports large capacities and a variety of form factors and interfaces, and consumes less power to address the astronomical amount of data stored within enterprises and by client users.

“There are several good interfaces available for enterprise SSDs but PCIe has become one of the best,” says Tobias Obeloer, Field Application Engineer at OCZ Storage Solutions. “Its direct connection to the host CPU provides ‘near-zero’ latency. The current PCIe 3.0 version provides up to 1GB/s of bandwidth per lane enabling PCIe SSDs to use 4 or 8 lanes concurrently, equating to 4GB/s or 8GB/s of achievable bandwidth from each device.”

Today’s enterprise servers have several PCIe slots available for SSD deployment and can accommodate up to 40 lanes of PCIe per CPU. A two-socket server can support 80 lanes of PCIe. With an ongoing performance gap between server processors and HDD subsystems, PCIe-SSDs are highly desirable and represent a fast-growing multi-billion dollar global opportunity over the next five years. At present, PCIe SSD deployments are at introductory levels.

To achieve these expected deployment levels, PCIe required a host-controlled interface standard. Without this, each SSD vendor has to develop their own proprietary drivers on how the SSD will interface with the host”, says Obeloer. “By standardising the interface, only one driver development is required. As such, the Non-Volatile Memory Express (NVMe) specification was created to deliver the full potential of non-volatile memory for enterprise and client platforms in support of PCIe-based SSDs.”

The NVMe host control interface allows for both system builders and storage vendors alike to develop the different parts of a storage ecosystem to the same specification enabling broad interoperability between storage devices, host platforms and supporting software. NVMe is an ongoing development effort coordinated through an open industry consortium of over 90 members under the direction of a 13-company promoter group.

UNDERSTANDING NVME BENEFITS

I/O requests in an enterprise ecosystem spend much of their time in the hardware infrastructure (that includes NAND flash media, the flash controller, the host bus adapter, related hardware, etc.), and only a small portion of time working through the software I/O stack. The NVMe standard streamlines the software I/O stack by reducing unnecessary legacy overhead and supporting multiple queues, and many more commands per queue than any other commonly used storage protocol - as outlined in Figure 1. NVMe supports 64,000 commands per queue (as well as 64,000
"Opportunities continue to unfold in the enterprise for flash-based solid-state storage as it provides faster I/O performance than hard disk storage, supports large capacities and a variety of form factors and interfaces, and consumes less power to address the astronomical amount of data stored within enterprises and by client users."

Published tests results indicate that the Linux NVMe software stack reduced software overhead by more than 50% (from 6μs to 2.8μs) when compared to a Linux SCSI/SAS software stack. The number of instruction cycles was also reduced from 19,500 to 9,100.

From an SSD vendor perspective, the NVMe interface has a number of benefits. First, standardisation makes the development effort easier with a common protocol between client and enterprise, as well as a plethora of optional features that open many new opportunities for firmware differentiation. Second, protocol efficiency streamlines the I/O stack to reduce stack latency as extensive queue depth and queue quantity support the inherent parallelism of flash based storage. Third, the implementation of a Data Integrity Field (DIF) delivers redundancy checks for transmitted read/write errors initiated by the host, which in turn, reduces system downtime as well as total operating cost (TOC).

NVMe VERSUS AHCI

The Advanced Host Controller Interface (AHCI) was designed for high latency rotating media back in 2004 rather than the low latency non-volatile storage required today. As such, AHCI cannot fully utilise SSD technology. NVMe is designed for PCIe SSDs and future memory technologies delivering low latency through a streamlined storage stack. It does not require register reads to issue a command whereas AHCI requires four non-cached register reads per command that adds approximately 2.5μs of latency.

The key benefits of NVMe versus AHCI include:

- With NVMe, support for multiple queues and high queue depths ensure that the CPU can be utilised to its full potential as I/O contention and system bottlenecks are greatly reduced.

READY TO UNLEASH PERFORMANCE

The Z-Drive 6000 Series is OCZ’s first NVMe-based SSD portfolio that addresses those enterprise applications requiring high-performance and low latency I/O responses coupled with the data protection, endurance and reliability that IT managers expect in enterprise environments.

It is built on the proven Z-Drive technology and pairs next generation PCIe and NVMe (Non-Volatile Memory express) technologies with robust reliability and an extensive feature set to deliver dramatic boosts in the number of random IOPS that an enterprise system can process coupled with significant reductions in I/O latency. The portfolio is available in multiple configurations - offering different form factors, capacity points, and endurance ratings to suit a wide range of applications and ecosystems.

More info: www.ocz.com/enterprise
No fewer than six of 2014’s top-12 box-office hits showcase the creative talents of MPC’s (Moving Picture Company) VFX (visual special effects) artists. From a 400-shot aerial battle in ‘Guardians of the Galaxy’ to ‘Maleficent’s’ cliff-side castle and the mutant-slaying Sentinels in ‘X-Men: Days of Future Past’, MPC’s visual effects have helped turn storyboard concepts into box-office billions.

Martin Weaver, Head of Infrastructure Delivery at MPC, says that blockbuster success takes both inspiration and infrastructure. “To support the technology requirements of high-end VFX, we’ve architected a performance-optimised IT infrastructure that’s deployed in MPC’s London, Montreal, and Bangalore facilities and that will streamline set-up of new global offices. This standardised infrastructure gives us agility and scale to support business growth and a broad range of technical requirements.

To keep pace with data demands, we use Avere’s FXT Edge filers to augment the performance of MPC core storage systems. A foundational technology in our IT infrastructure, Avere’s solution provides cost-effective performance acceleration for rendering and other heavy-I/O workloads.”

**BIGGER FILMS MEAN BIGGER CHALLENGES**

Weaver says growth presents constant challenges for infrastructure design. He cites multiple dimensions that pressure IT systems and storage. “Moving higher up the echelons of VFX quality dramatically increases the amount of data that goes into rendering an image. That means we’re working with larger and larger data sets to deliver the client’s desired visual results, whether for photo-realistic images, full-frame characters, or convincing fluid-based simulations. At the same time, we’re running more concurrent projects, working on larger and bigger-budget films, and providing infrastructure resources to more creative seats.”

Weaver’s team must ensure sufficient IT infrastructure - including storage capacity and performance - to meet the demands of this growth. Budget and space constraints add to the challenge: “In the UK, for example, all of our creative seats and core NAS storage are located in MPC’s central-London facility. Because it was impractical to expand in that location - you’ll know from Monopoly that the centre of London is the most expensive part of the board - we opted to house the render farm off-site at our data centre in Pinewood. But without a solution to manage down the traffic between sites, we faced prohibitive telecommunications costs.”

**BOOSTING STORAGE PERFORMANCE**

Weaver explains that London’s limited-real-estate challenge was the catalyst for one of MPC’s first Avere deployments. “Deploying an Avere Edge filer at the render-farm end of the communications link, we were able to accelerate NFS performance to the farm and simultaneously reduce network traffic between the Pinewood data centre and our London facility.”
"Moving higher up the echelons of VFX quality dramatically increases the amount of data that goes into rendering an image. That means we’re working with larger and larger data sets to deliver the client’s desired visual results, whether for photo-realistic images, full-frame characters, or convincing fluid-based simulations. At the same time, we’re running more concurrent projects, working on larger and bigger-budget films, and providing infrastructure resources to more creative seats."

Today, Avere Edge Filers boost storage performance and efficiency at MPC global facilities, including the studio’s London, Montreal, and Bangalore sites. At each site, Avere clusters offload EMC Isilon core storage to accelerate rendering processes and deliver maximum interactivity to artist workstations. Across MPC facilities, Avere Edge Filers deliver scalable performance to various sizes of render farms running an application mix that typically includes Autodesk Maya, The Foundry NUKE, and Pixar RenderMan software.

SATISFYING THE THIRST FOR NEW EFFECTS

“In the VFX industry where last year’s best becomes this year’s norm, the amount of data that goes into image rendering grows at an even faster rate than Moore’s law predicts on the compute side,” notes Weaver. “Moving from 2K to 2K-stereo or 2K to 4K resolution, for example, means more data—and more IOPS and throughput. There’s also a continual thirst for the new effect, the showstopper that’s not been done before.

The datasets required to produce these new images combined with the increasing complexity of interactions, quantities of geometry, and numbers of characters and assets in a shot continue to drive the demand for high-speed I/O. To prevent general slowdowns as demand increases, we redirect much of our heavy-I/O traffic to Avere. The Avere cluster effectively boosts I/O performance so that we can keep up with the rendering demand and at the same time take the strain off our core storage systems to ensure responsiveness to other applications."

In London, MPC also uses an Avere cluster to enable faster loads from a third-party-software and tool server. Instead of waiting minutes to pull required rendering scripts and other data off the software server, render nodes can start almost instantly. With hundreds of machines simultaneously attempting to initiate the same render, timesavings are dramatic. Weaver reports that the Avere cluster has continued to keep pace with demand, even as MPC has expanded the farm by 300 percent.

UNLEASHING CREATIVITY

“Dealing with performance bottlenecks can be like playing whack-a-mole,” adds Weaver. “By reducing strain on core storage, Avere ensures we can handle heavy rendering loads while maintaining maximum responsiveness to artist workstations. Hundreds of artists work at each site, so maintaining their productivity is essential. Better interactivity also fosters creativity, so it’s important to minimise the frustration that comes from waiting in front of an idle workstation screen.”

POWERING GROWTH

Avere’s solutions help MPC save on both telecommunications and infrastructure costs. In London, for example, Weaver estimates that without Avere efficiencies, the cost of bandwidth to the remote render farm would have doubled. In smaller MPC facilities, Avere technology enables use of cost-reduced core storage systems that can be configured with more economical - versus high-performance tier 1 - disk drives.

“Having effectively turbo-charges I/O so we can handle heavy rendering workloads and meet peak-production demands without deploying additional infrastructure and incurring all of the related data centre costs,” Weaver says. “Avere also offers future flexibility to, for example, take advantage of object-based storage, either as a private, on-prem repository or in a public cloud. Avere really gives us benefits in multiple directions, from reducing infrastructure costs to extending the use of our core storage and conserving data centre space as the business grows. We continue to find new ways to put these resource and budget savings to work delivering blockbuster results for our clients.”

More info: www.averesystems.com
David Tyler: For readers who may not know much about QBS, where did the business come from, and how would you summarise where you are now?

Grant James: QBS Software Ltd is a privately owned reseller founded in 1987. QBS started as an independent software vendor when the developer market and internet were still in their infancy. Today we take for granted the wealth of information search engines are able to locate, however in the 80’s and early 90’s before the internet was commercialised, real time reliable information was the commodity that sold. QBS found itself providing developer's information and developer software - QBS went on to produce a quarterly technical software magazine.

Today, QBS is an EU Value Added Reseller providing technical software with a current turnover of 17.5 million - we are growing at 25%-30% annually and anticipate reaching 22 million at the end of this financial year.

DT: Is there something specific about the QBS proposition that differentiates you in the market?

GJ: The QBS motto, “We make it happen”, is how we encourage each member of staff to behave - to be responsive and responsible.

Over decades, we have perfected our logistics and provide a world class customer service second to none that meets even the most demanding customer service level agreements. As a privately owned company, we are vendor agnostic and totally impartial; this enables QBS to provide almost any software to any vertical.

I believe in partnerships rather than agreements: where partnerships share responsibilities and strive to work together for a common good, agreements try to apportion blame and reduce responsibility.

DT: How do you plan what products to include in your portfolio? Is there a ‘typical’ QBS partner?

GJ: We look for high quality, reasonably priced products that are the best of breed - that's not as simple as it sounds. There can be dozens of manufacturers in each technology stack whose products range from cheap and cheerful to the incredibly sophisticated that come at an eye watering price. We aim for the middle ground where products are easy to install/use, well-conceived, win awards, and come reasonably priced.

Each vendor/manufacturer will have nuances, different licensing models, specific requirements and discount models etc. - we master these differences in order to work more closely with them. We provide free 90 days pre and post-sale first-line technical support and leverage our direct relationships with manufacturers to...
"The software industry is rapidly approaching its mature phase where there are fewer new technologies appearing and existing technologies have software in double digit versions. With mature products... there is not much more manufacturers can add to the features and benefits. This is driving veteran manufacturers to force customers into a subscription model under the friendly disguise of a 'cloud'. Selling software as a subscription is a game changer - in whose favour is yet to be determined."

provide second- and third-line support where possible.

We represent a variety of manufacturers who provide excellent network monitoring software. One in particular we highly recommend for quality and affordability is Solarwinds - it's a full time job keeping up with the progress of this manufacturer and all the awards they win.

Relevant to this magazine, Solarwinds Storage Resource Monitor provides multi-vendor storage performance and capacity monitoring. Now I can bleat on about the merits of SolarWinds Storage Resource Monitor until the cows come home, but instead I'd recommend your readers evaluate it for themselves - if any would like free technical assistance during the evaluation, please contact QBS.

DT: What are the issues facing your customers today? Is it about changing buying models (e.g. cloud, Office365 etc.) and licensing, or is it about technology?

GJ: The software industry is rapidly approaching its mature phase where there are fewer new technologies appearing and existing technologies have software in double digit versions. With mature products - besides getting the product to make tea and coffee - there is not much more manufacturers can add to the features and benefits. This is driving veteran manufacturers to force customers into a subscription model under the friendly disguise of a 'cloud'. Selling software as a subscription is a game changer - in whose favour is yet to be determined.

The internet will continue to influence software development, but there is a limit to what software can do when provided as an application over the internet - just as there are limitations using a tablet over a traditional PC in a productive working environment. Recent reports suggest people working from home are less productive than those in an office.

The pendulum is being pushed heavily in one direction for commercial reasons and eventually customers will have gained sufficient experience through trial and error to ultimately decide what technologies they wish to use and how they wish to consume them.

DT: What emerging trends do you think will influence both your customers and your own business offerings over the next few years?

GJ: Managing data efficiently and effectively has become a science. What defines the human species is its ability to seek and accumulate information - we use data to prove and improve our existence. Data powers data demand, as we take data and add to that data to create even more data. Everything we do is monitored, generating data that needs to be stored somewhere and be available on demand - finally we duplicate that data for safe keeping.

At 7 billion humans and counting, human data generation will continue to grow exponentially and those manufacturers who produce good data storage technologies at a reasonable price will always be in demand.

DT: Lastly, what do you believe the future holds for QBS as a business - what is the marketing strategy to take you to the next level, however you may define that?

GJ: That would depend on how far into the future you wish to peer. QBS is a highly adaptable organisation and we try not to have fixed opinions in a fluid world. Marketing in an 'Internet of Things' world is struggling to find its feet. In some circumstances, traditional marketing can be as effective as electronic marketing; however traditional marketing cannot always deliver the data - metrics - we humans demand.

We are specialising in some key technologies such as network monitoring which should not be affected by any move to the cloud or hybrid environment. We have manufacturer technically certified/qualified staff members who provide exceptional service. We partner with specialist technical service providers where necessary and provide a level of impartiality we don't see in our competition.

More info: http://www.qbssoftware.com/
In 1991 Geoffrey Moore published ‘Crossing the Chasm: Marketing and Selling High-Tech Products to Mainstream Customers’. This seminal marketing textbook explored the ‘diffusion curve’ - the rate at which new technology products and services are adopted across any given market. The book is still in print today, is still a bestseller, and as Tom Byers, Faculty Director of the Stanford Technology Ventures Program put it, is ‘still the bible for entrepreneurial marketing’.

The reason for this is simple: Moore’s description of the way new technologies are adopted in enterprises illustrates a clear truth. Even if you haven't read the book you will be familiar with his terms: ‘innovators’, ‘early adopters’, ‘early majority’, ‘late majority’ and ‘laggards’.

‘Innovators’ are people that take up products with exciting potential when they are still in their infancy. This is risky but offers major rewards. Next are the ‘early adopters’ who see the potential in new technology as it becomes workable. When a technology succeeds with early adopters, it can ‘cross the chasm’ into early and late ‘majority’ territory: mass-market sales. Finally, there are the ‘laggards’, last to adopt. Its called chasm for good reason: for every vendor who successfully bridges the gap, many more fail.

Moore’s description of technology adoption is especially apt in ‘me too’ markets where there is little real differentiation between products - like the enterprise storage market. Take a look at proprietary solutions from any of the household names - be that EMC, Dell, HP, or IBM - and you will struggle to find real differences. It's like the choice between a BMW, a Jaguar, a Mercedes or a Lexus: everyone has a preference, but there’s no clear-cut winner on price, running cost or performance.

**STEP CHANGE AHEAD**

Yet, every so often, Moore's take on the diffusion curve is wrong. Circumstances combine to create a situation where a technology doesn’t just cross the chasm, it builds an eight lane motorway and charges across at speed. For this to occur, two things need to happen:

1. The new technology needs to deliver a genuine step change: real benefits as opposed to marginal differences
2. The problem the technology solves or advantage it delivers must be big enough to offset early adoption fears

Both of these circumstances are now present in the enterprise storage market, and accordingly the market is going to change quickly and permanently: traditional enterprise storage vendors are facing a ‘change or die’ moment because the advantages of software-defined storage represent a step change.

The cost advantage of software-defined storage is huge. Software-defined storage eliminates the need for proprietary hardware and software, so IT teams can work on commodity x86 hardware and discs, generating as much as 50% cost saving. That means massive cost reduction and no vendor lockdown.

**PRESSURE POINTS**

And the pressing problem or advantage? The key problems with storage are so often stated that everyone knows them - we’re storing more and more data, much of it is unstructured and we are keeping it for indefinite periods.

Here's the top seven pain points as measured by 451 Research:

1. Data growth
2. Cost management
3. Capacity forecasting
4. Performance
5. Complexity
6. Management
7. Compliance

The top three are data growth, cost management and capacity forecasting. Together these are a perfect storm: fierce unpredictable growth, management issues and cost problems.

In these circumstances is it any wonder that analysts from Gartner to IDC are united in forecasting the unstoppable rise of software-defined storage? In a word, ‘no’: open source based software-defined storage marks the beginning of a new era of more agile, scalable and cost-effective storage, and will emerge as the dominant storage architecture.

More info: www.suse.com
THE STORIES XII

JUDGEMENT DAY!
JUNE 18TH - 2015

WWW.STORAGE-AWARDS.COM
Storage is changing... the good news is your expectations can too.

At Q Associates we live and breathe information technology and we’re passionate about the difference it can make to an organisation when you get it right.

The relentless growth of data has meant that we all have to be smarter about the way that we work. Buying a bigger box, simply doesn’t cut it. The world has moved on.

That’s where we’re different. We aim to collaborate with our clients, combine our skills and knowledge and provide versatile solutions designed for todays changing market.

If you share our view that harnessing your data could have a profoundly positive affect on your organisation, then we’d love to work with you...

Q Associates

Your IT. Our Business.

For Award Winning storage advice, contact storage@qassociates.co.uk