Hyper-Converged Solution

Date:
Q2 2018

Application:
Hyper-Converged S2D Storage

Tags:
Storage Spaces Direct, DR, Hyper-V

CUSTOMER:

The Cam Academy Trust

Set up in 2011 to oversee the conversion of Comberton Village College to academy status, its role is now to ensure excellence for all in each of the Trust's 10 academies.

SOLUTION BRIEF:

The Cam Academy Trust approached us to consolidate current storage and compute infrastructure stretched between 9 sites into 1 scalable cluster with DR replication and failover.

020 8997 6000
sales@broadberry.co.uk
www.broadberry.co.uk

Application

- Hybrid-Cloud Solution
- Microsoft Storage Spaces Direct
- Hyper-V + Azure

Project Background

The Cam Acadamy Trusts' 9-year old system was struggling to keep up with current user demands. This aging system was hard to manage and under-resourced.

We were asked to design and install a new system which would overcome existing hardware and network issues whilst staying within a tight budget.

Key Requirements:

- Able to handle high network traffic, with large boot storms
- No single point of failure
- Easy to manage disaster recovery
- Future-proof for latest technologies
- Compatible with public cloud offering of Microsoft Azure
- 3-Year, Next-Business-Day On-Site Warranty
- Usable storage capacity of 40TB

020 8997 6000
sales@broadberry.co.uk
www.broadberry.co.uk

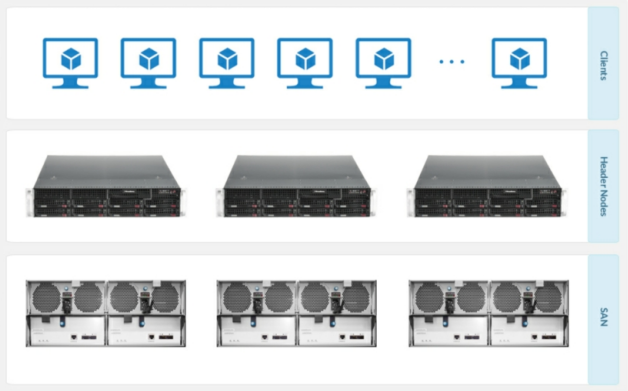
Previous Infrastructure

The trust's previous compute and storage infrastructure was built primarily from DELL servers, which were dated and struggling to keep up with current application demands due to insufficient memory as well as processing power.

These nodes were distributed across the 9 schools within the Trust, which in total served around 5,000 mainly office-based users.

This system had grown over time and so incorporated hardware from a number of different vendors which connected by a mixture of Fibre and iSCSI network infrastructure. This often led to compatibility issues for network administrators as well as complicating network management.

Classic compute and SAN / NAS infrastructure with significant network complexity



Existing Issues:

1. Hardware distributed across 9 locations was a large management burden.
2. Aging servers were unable to keep up with current CPU / memory demands, especially during frequent boot storms.
3. Networking issues when managing multiple network fabrics (Fibre and iSCSI)
4. Physically managing disaster recovery across 9 sites was labour-intensive

020 8997 6000
sales@broadberry.co.uk
www.broadberry.co.uk

Broadberry Solution

Having designed and installed a large range of high-availability storage solutions for some of the world's largest brands, we had a range of options that would have fit The Cam Academy Trust's requirements.

After analysing our options we felt that the Broadberry Hyper-Converged S2D solution would be the ideal fit.

Why Broadberry Hyper-Converged S2D Solution:

- The Cam Academy Trust had already migrated part of their infrastructure to Microsoft Azure Cloud service; our private cloud was a natural extension to this.
- Broadberry could offer a Windows-based solution significantly cheaper than Nexenta or Open-E based solutions due to Microsoft's educational discount which The Cam Academy Trust was eligible for.
- Broadberry open-standards based hardware offers no vendor lock in and easy future expandability at significantly lower cost than alternative solutions from DELL EMC, HPE and other tier 1 server manufacturers.

Microsoft Storage Spaces Direct

Simplicity. Go from industry-standard servers running Windows Server 2016 to your first Storage Spaces Direct cluster in under 15 minutes. For System Center users, deployment is just one checkbox.

Unrivaled Performance. Whether all-flash or hybrid, Storage Spaces Direct easily exceeds 150,000 mixed 4k random IOPS per server with consistent, low latency thanks to its hypervisor-embedded architecture, its built-in read/write cache, and support for cutting-edge NVMe drives mounted directly on the PCIe bus.

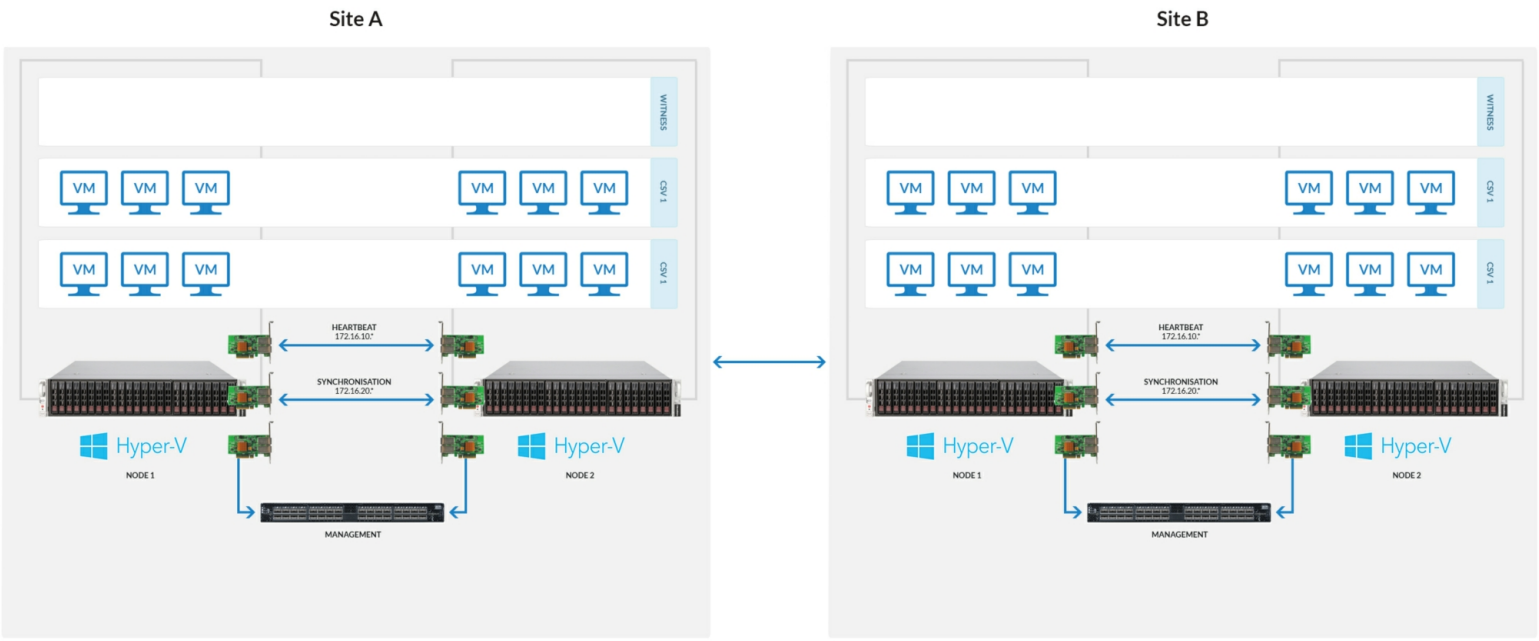
Fault Tolerance. Built-in resiliency handles drive, server, or component failures with continuous availability. Larger deployments can also be configured for chassis and rack fault tolerance. When hardware fails, just swap it out; the software heals itself, with no complicated management steps.

Resource Efficiency. Erasure coding delivers up to 2.4x greater storage efficiency, with unique innovations like Local Reconstruction Codes and ReFS real-time tiers to extend these gains to hard disk drives and mixed hot/cold workloads, all while minimizing CPU consumption to give resources back to where they're needed most - the VMs.

Manageability. Use Storage QoS Controls to keep overly busy VMs in check with minimum and maximum per-VM IOPS limits. The Health Service provides continuous built-in monitoring and alerting, and new APIs make it easy to collect rich, cluster-wide performance and capacity metrics.

Scalability. Go up to 16 servers and over 400 drives, for up to 1 petabyte (1,000 terabytes) of storage per cluster. To scale out, simply add drives or add more servers; Storage Spaces Direct will automatically onboard new drives and begin using them. Storage efficiency and performance improve predictably at scale.

020 8997 6000
sales@broadberry.co.uk
www.broadberry.co.uk



Windows Storage Spaces Direct - **2 Node Cluster + Replication**

Windows Storage Server 2016

Broadberry

4x Broadberry Hyper-Converged Node

- Broadberry S2DHY4N8H
- 2x Intel Xeon SP 6148 Gold Xeon Processor 20 Core / 2.4Ghz
- 10x 32GB DDR4 2400Mhz RAM ECC Registered
- LSI 9300-8E HBA
- 2x Intel S4500 Series 480GB SATA Solid State Drive
- 8x Toshiba 6TB SAS Enterprise Hard Disk Drive 7200rpm 12GB/s
- Mellanox MCX314A-BCBT 40/56GbE Network Interface Card
- 2x Intel NVMe 2.5" P4600 1.6TB 2.5" SSD Drive
- Mella nox MCP2M00-A00A 0.5M SFP 25Gb/s Direct Attached Cable
- Intel X540T2 Dual Port 10GBE PCI Express Adapter
- 2.5" Hot-Swap Read Drive Bay
- Trusted Platform Module

1x Broadberry Backup Storage Appliance

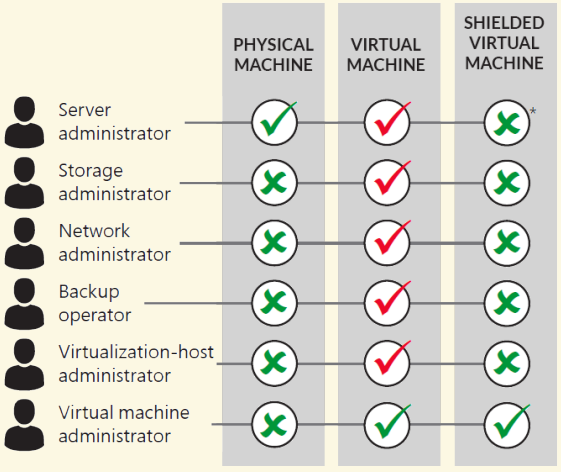
- Broadberry CyberStore 208S
- Intel Xeon E3 1220 v6 Processor
- 2x 8GB DDR4 2400MHz RAM ECC Unbuffered
- 2X Intel S4500 Series 240GB SATA SSD
- LSI MegaRAID SAS 9361-8i 8-Port SAS RAID Controller
- 8x Hitachii 10TB SAS Enterprise-Class Hard Drive
- LSI CacheVAULT CVM02 for 93xx Series RAID Protection

Increased Security

As well as improving performance, our S2D solution also greatly improved security.

One additional layer of security was the application of an onboard Trusted Platform Module (TPM).

This outstanding hardware base solution ensures that the information like keys, password and digital certificates stored within is made more secure from external software attacks and physical theft.



020 8997 6000
sales@broadberry.co.uk
www.broadberry.co.uk

How Our Solution Addressed Previous Issues:

1. Hardware distributed across 9 locations was a large management burden.

Using our high-performance hyper-converged nodes along with Storage Spaces Direct Storage Replica block level replication feature we were able to consolidate 9 physical sites to a 2 site stretch cluster.

This significantly reduced hardware footprint allowed for much lower power consumption and reduced TCO, whilst providing the benefit of easier maintenance.

2. Aging servers were unable to keep-up with CPU / memory demands, especially during frequent boot storms.

Our new high-performance hyper-converged nodes offered fantastic performance through the latest server and storage technology.

To handle user demand, each node was configured with 320GB of DDR4 2400MHz memory and dual Intel Xeon SP Gold processors along with NVMe accelerated enterprise-class 12Gb/s SAS drives.

This significantly improved capability offered over 427,000 read IOPS and totally eradicated issues during the frequent bootstorms throughout the day.

3. Networking issues when managing multiple network fabrics (Fibre and iSCSI)

Our hyper-converged solution standardised all network architecture onto 10 / 25GbE which greatly simplified network management and reduced required cabling.

This approach boosted network performance and allowed future expandability at no extra cost. Utilising RDMA released valuable CPU resources which would otherwise be taken up by the network controller.

4. Physically managing disaster recovery across 9 sites was labour-intensive

Storage Spaces Direct Storage Replica feature greatly simplified disaster recovery as it could all be done from 1 physical location (the secondary site).

Bi-Directional disaster recovery was achieved by synchronously replicating Site A to B and vice versa . The entire data set is backed up from site B to a separate backup server, which is then also backed up to Azure cloud storage.

The Cam Academy Trust significantly reduced RTO and RPO to the levels of virtually instantaneous recovery using this approach.

To achieve full peace of mind we followed the 3 2 1 backup rule of 3 types of media, backing up to 2 locations with 1 of them being off-site. In the event of an entire site failure, our solution provides seamless failover, allowing service to continue with users completely unaffected and unaware.

020 8997 6000
sales@broadberry.co.uk
www.broadberry.co.uk

Storage Servers

Configure From £1,078

Multi award-winning, enterprise-grade storage solutions used by the world's top organisations.

As-well as thousands of SMBs for everything from backup and replication to high-availability storage.

Rackmount Servers

Configure From £434

Year-after-year voted the best servers available by the most influential IT brand in the UK.

Our CyberServe range of servers are used by all of the UK's top universities and thousands of SMBs.

Workstations

Configure From £234

Ultra high performance workstations built for the most demanding applications.

Our CyberStation range boasts everything from silent workstations to GPU supercomputers.

Trusted by the World's Biggest Brands

We have established ourselves as one of the biggest storage providers in the UK, and since 1989 supplied our server and storage solutions to the world's biggest brands. Our customers include:

BBC, sky, itv, Virgin, GMTV, Shazam, GCHQ, Toyota, NASA, CERN, Sony, Toshiba, Rolls-Royce, Walt Disney, ESPN, symantec., University of Oxford, University of Cambridge, Tesco, redhat.

020 8997 6000
sales@broadberry.co.uk
www.broadberry.co.uk