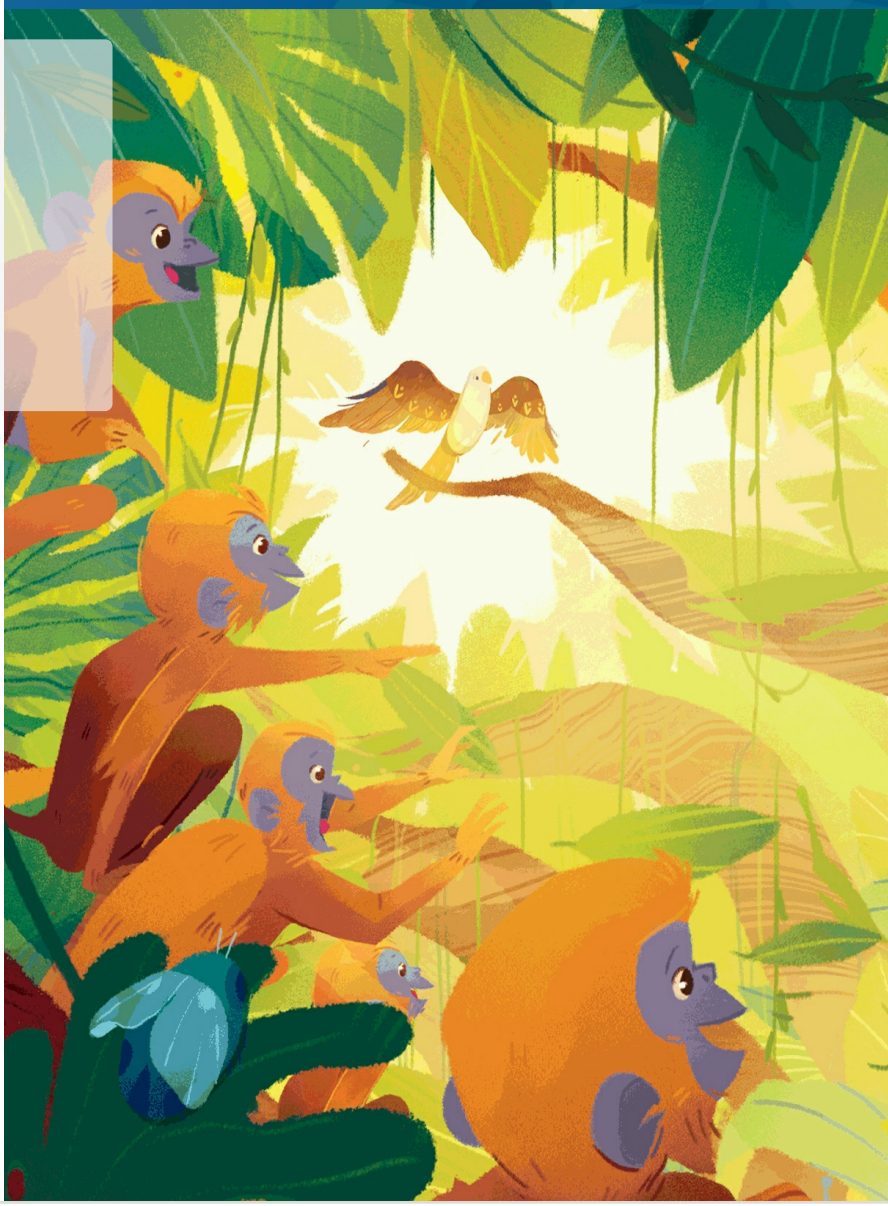
Hyper-Converged Solution

Date:
Q2 2019

Application:
Hyper-Converged VMware Solution

Tags:
VMware, Jovian, HA Cluster



CUSTOMER:

Usborne Publishing Ltd

Usborne is the UK's leading specialist children's book publisher: an independent, family business which creates engaging, innovative, accessible books for children of all ages.

SOLUTION BRIEF:

Usborne Publishing Ltd. approached us to replace their internal slow and dated converged VMware cluster and SAN with an enterprise-grade, cost-effective replacement.

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USBORNE

Application

- VMware
- Hyper-Converged
- Private Cloud Solution

Project Background

Usborne's existing system was struggling to keep up with current 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 providing enterprise-grade redundancy.

Key Requirements:

- Low Latency
- High IOPS
- Able to handle high storage throughput
- No single point of failure
- Easy to manage disaster recovery
- Future-proof for latest technologies
- 3-Year, Next-Business-Day On-Site Warranty

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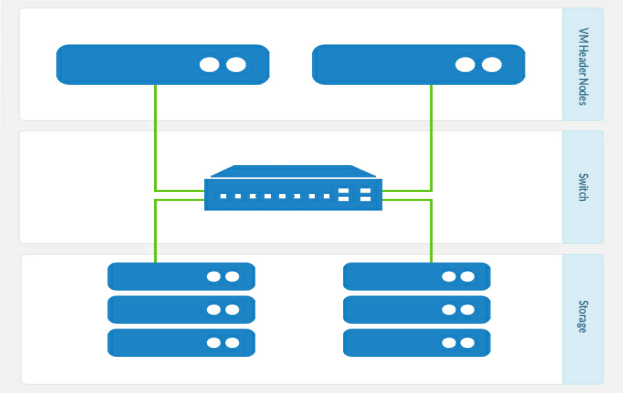
Previous Infrastructure

Usborne's previous infrastructure was based on a traditional compute structure with a HPE VMware host connecting to 2 storage arrays via ISCSI.

Usborne Publishing Ltd.'s previous simple, non-HA VMware solution



Existing Issues:

1. **Latency Issues - requiring reboot to continue**

   The dated hardware powering Usborne's previous infrastructure suffered from latency spikes between the VM host and iSCSI storage servers. No solution could be found to this problem, which required scheduling a maintenance window and restarting the servers in order to get the stack operational again.

   This had to be done outside of working hours, making it costly as well as inconvenient.

2. **No Failover / Redundancy Built In**

   Usborne's previous solution incorporated no built-in failover / redundancy, leaving them exposed in the event of hardware failure or storage corruption.

   If the storage host server failed, Usborne would have no access to its data until the VMware host or underlying storage was repaired and online again.

   Usborne's previous setup consisted of a VM host, connected independently to iSCSI storage arrays. In the event of one of these VM hosts going offline, the second host server did not have enough resources to power all the virtual machines, so IT administrators would need to prioritise which services to get back online.

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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 address the issues Usborne Publishing were facing with their aging storage infrastructure.

After analysing our options we felt that a Broadberry all-flash, hyper-converged infrastructure would be the best solution.

Broadberry Hyper-Converged Proposed Solution:

Broadberry technical sales department designed an all-flash, hyper-converged infrastructure for Usborne Publishing which consolidated their entire infrastructure to just 2 nodes plus 2 dual-port SAS JBODs whilst still boasting no points of failure.
For provision of storage we deployed Jovian DSS for storage management, configure in High-Availability Cluster - allowing for consistent provision of datastores even in the event of complete failure of one of the nodes.

At VM level, all virtual machines are protected by VMware HA functionality, which in event of host failure would migrate and restart virtual machines from failed node onto the remaining node, allowing continuous provision of services.

Broadberry storage is fully compatible with VMware's API, allowing for consistent snapshots to be stored locally. In the event of a ransomware attack or user error, Usborne IT administrators will have the capability to revert to a previous state in a matter of minutes.

Key Numbers

£30k+
Cheaper than competitors quote

+3,500%
IOPS Increase

-90%
Latency Decrease

Broadberry Solution Specifications

Our accepted solutions was based on 2x hypervisor hosts and 2x dual-port all-flash SAS JBODs

Benefits:

- Replaced existing iSCSI storage with VMware ready ZFS network attached storage, consolidated within the VM host
- Storage nodes running as VM's eliminate the need for additional
- SSD-powered storage dramatically increased IOPS
- Consistent snapshots stored locally
- Full redundancy at both host and storage level
- Fully compatible with VMware API
- Thin-provisioned storage and compression by default - data reduction ration 2/1
- Online capacity expansion without need to initialise storage pool - across 2 JBODs 36 free slots allows for future expansion
- Automatic rebalancing
- Read caching in RAM memory
- 10GBe connectivity
- Support of iSCSI NFS SMB and Fibre channel if required
- Significant performance increase noticed by remote-working staff

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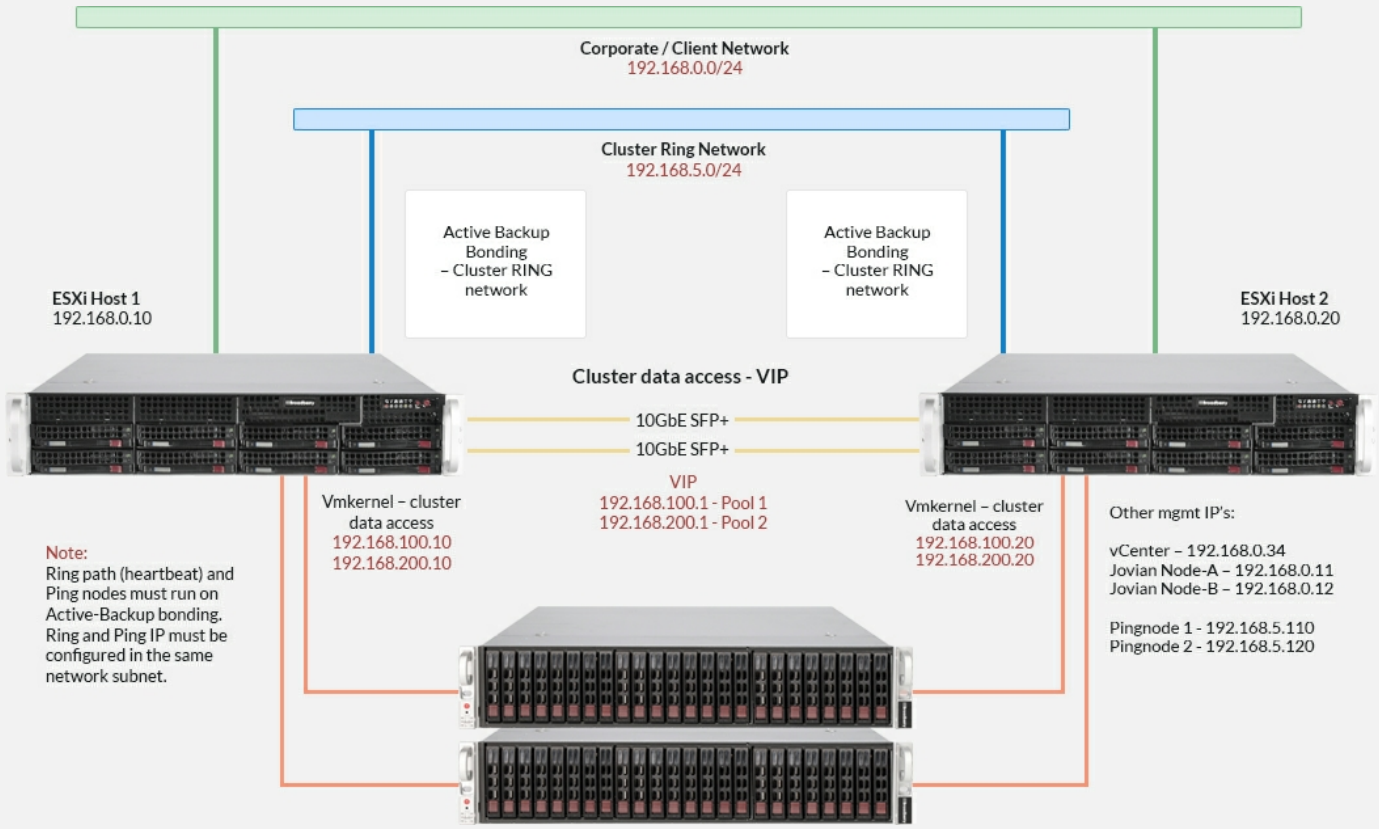
Broadberry Hyper-Converged Solution



2x Broadberry CyberServe Xeon SP2 208S

- 2U Chassis with 8 Hot Swap Drive Bays & 2 Internal Fixed Drive Bays Single 560 Watt Power Supply
- X11DPI N, Dual Gigabit LAN,16 Dimm Slots(up to 2TB RAM), On Board Graphics, On Board SATA RAID 0,1,
- IPMI & Remote KVM
- 2x Intel Xeon Gold 5120 Processor 14 Cores, 2.20GHz, 19.25MB Cache (105Watt)
- 10x 32GB 2666MHz DDR4 ECC Registered DIMM Module
- Use On Board RAID of Motherboard (BASIC SATA RAID 0,1,5 ONLY)
- Rackmount Full extending Rail Kit included as standard
- 2x 240GB Intel SSD S4510 DataCentre SERIES 2.5IN SATA3 Drive
- LSI 9300 8e Host Bus Adaptor (Non RAID) 12Gb/s SAS 3.0
- 2x 10GbE Dual Port SFP+ (Direct Attached) Server Adapter Intel E10G42BTDA
- Intel i350T4 Quad Port Gigabit Server LAN Adapter RJ45 10/100/1000
- Open E JovianDSS
- VMWARE ESXI 6.7 Installation

2x Broadberry CyberStore 224S-JBOD

- Broadberry 2U 24 Bay, 12Gb/s SATA/SAS JBOD Unit Dual Port
- 4x 1m External Mini HD SAS Cable SFF 8644 to SFF 8644
- 12x 3.84TB Samsung Enterprise SAS 12Gbps 200K IOPS,1250MB/s,1DWPD
- 4 Hour Onsite Support for 1 year

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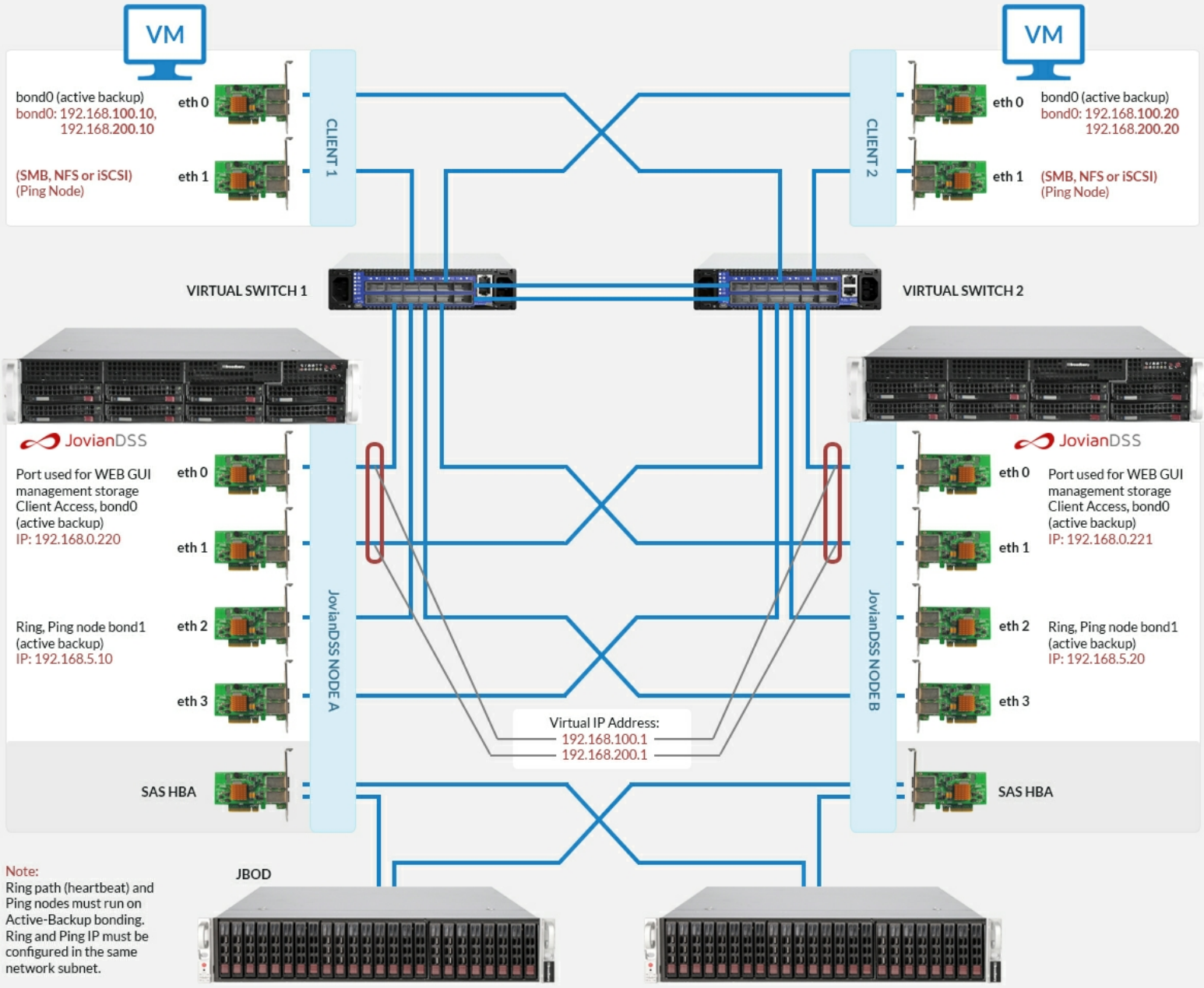
Broadberry Hyper-Converged Solution



Open-E JovianDSS
- High-Availability Cluster

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How Our Solution Addressed Previous Issues:

1. Latency Issues - requiring reboot to continue

Broadberry storage engineers carefully designed the new hyper-converged solution to be able to handle current storage requirements with more than enough resources for future expandability in terms of both processing and storage.

In order to ensure Usborne's latency issues were a thing of the past, our storage specialists configured the compute nodes with dual Intel Xeon Gold 5120 Processors and 320GB of 2666MHz DDR4 ECC Registered memory. This will ensure the compute layer is capable of handling workload, even in the unlikely event of a node failing and all VM's running of one node without any impact on performance.

To negate any possible latency at storage level we configured the NAS appliances with enterprise-grade SSD's. In our in-house testing before the solution was delivered to Usborne, we found this setup decreased average latency to just 1.5ms, and provided a massive IOPS increase over the previous infrastructure.

At network level we omitted any possible latency by using a dedicated point-to-point 10Gbe interconnect between ESXI hosts, allowing more than enough throughput, whilst eliminating unnecessary hops.

2. No Failover / Redundancy Built In

Broadberry engineers approached the need for redundancy at three levels - the server level, network level and disk shelf in order to offer a fully redundant solution with no single point of failure.

We built in redundancy at the server level by incorporating VMware HA, where virtual machines are stored on a redundant datastore and restarted on the secondary node in the event of the node failing. This reduced user downtime to a matter of seconds in the unlikely event of hardware failure, as opposed to hours/days.

At network level we incorporated redundancy by bonding dual network interfaces running on stacked switches, which offers transparent failover event of failure.

Lastly we incorporated redundancy at disk shelf level by two-way mirroring the SSD drives. This offered the best mix of redundancy and performance. As all data is written to 2 physical locations, if a JBOD was to fail all data would still be accessible.

This multiple-layer approach to redundancy allows Usborne IT administrators to have total peace of mind their data is safe, with a number of restoration options available depending on the severity of the incident.

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