

VirtuCache Case Study



USE CASE

- Double VM Density

LOCATION

- Silicon Valley

VIRTUALIZATION AND STORAGE ENVIRONMENT

- Four Dell 4-node C6420 servers running VMware 6.5 and Windows VMs.
- 64TB on a Hitachi Hybrid Storage Appliance.

CHALLENGES

- Increase the number of VMs on each host so that fewer physical servers would be needed.

SOLUTION

- VirtuCache was caching to 1.6TB in-VMware NVMe SSD

BENEFITS

VirtuCache increased the number of VMs per host from 20 to 42, resulting in hardware cost savings

The VirtuCache Difference

MBIT compared VirtuCache with VMware VFRD. VirtuCache resulted in 2X VM densities versus VFRD since cached reads and Writes, whereas VFRD only cached reads.

VirtuCache Reduced Server count by 50%

MBTI is a not-for-profit organization that improves the performance of people and organizations. They are best known for Myers-Briggs tests, the world's foremost personality assessment tests used by institutions to help employees better understand themselves and how they interact with others.

Main Challenges

MBTI wanted to repurpose few of their expensive Dell C6420 servers to run additional applications, which meant that they would need to increase the number of existing VMs deployed on each host. As is often the case, there was plenty of CPU, memory, and networking capacity available on each one of the servers, and it was only storage latencies that started to increase disproportionately with higher VM densities.

MBTI decided to look for the cheapest possible solution that would improve storage throughput and latencies, which in turn would facilitate the migration of additional VMs to each VMware host.

IT Infrastructure

- Workload Characteristics – On an average, less than 16 TB of data changed every day and read-write mix varied widely between 40-60 to 80-20 read-write ratio.
- VMware's Distributed Resource Scheduler (DRS) functionality was configured to be automatic and aggressive, which ensured that workloads were equally distributed at all times across these 4 physical hosts.

VirtuCache Deployment

MBTI decided to deploy VirtuCache on two of the four physical servers in the cluster. A 1.6TB NVMe card was used by VirtuCache to cache data from Datastores. VirtuCache along with the NVMe drive was installed in the ESXi host in under 30 minutes.

Steady state Cache Hit Ratio (ratio of IO served from the in-server SSD to the IO served from backend LUNs) was at 75-80%, with warm-up time of 10 minutes.

Guest Average Latency (GAVG) was measured before and after VirtuCache, using the standard VMware utility called esxtop. The below chart shows reduced GAVG after deploying VirtuCache, which resulted in higher VM densities. Since auto-DRS was enabled on the VMware cluster, VMware automatically sensed improvements in storage performance on the server that had VirtuCache installed and moved VMs from the other servers to these two VirtuCache accelerated servers, increasing the number of VMs from 20 before VirtuCache to 42 after VirtuCache.

Using VirtuCache, MBTI was able to reduce the number of physical servers in their VMware cluster from four to two, thus reducing VMware licensing costs and hardware costs.

GAVG as measured using ESXTOP	Before VirtuCache	After VirtuCache
Read GAVG	35-1500 ms	0.1 – 6 ms
Write GAVG	20 – 600 ms	0.1 – 6 ms