

Virtana Storage Load Testing enables a Leading Healthcare System to select optimal flash storage array that matches application I/O profiles



ABOUT

Industry
Healthcare

Headquarters
USA



OBJECTIVE

Test "smart" storage arrays under various workload parameters in a production representative environment



RESULTS

- Validated the arrays and configurations that would offer the best performance and mitigated the risks of deploying the new arrays into the production data center
- Gained full confidence that the flash-based storage system being selected can support the workloads in their production data center

ABOUT Leading Healthcare System

This healthcare provider is one of the nation's largest and most comprehensive hospitals, with over 2,000 beds, over 2 million patients per year, and over 20,000 staff.



THE CHALLENGE:

This leading Healthcare System was evaluating flash-based arrays for a variety of performance-sensitive virtualized applications running on VMware VMs, over fibre channel, SMB, and NFS. They were looking for a valid test appliance/software that simulates workloads representative of their production application workloads.

"We wanted to test certain 'smart' storage arrays that support dedupe and compression; therefore, lometer and similar tools were not appropriate," said a storage engineer at the Healthcare System.

SOLUTION AND PERFORMANCE COMPARISON PROCESS

The hospital worked with the Virtana Professional Services team to define the tests, deploy Virtana Storage Load Testing, run the tests, analyze results, and make recommendations. The comparison was done by measuring performance characteristics (IOPS, throughput, and latency) corresponding to the workloads generated by Virtana Storage Load Testing.

Before the IOPS and throughput tests, raw capacity tests were run to determine limits of the amount of non-reducible data that can be put on both of the



arrays and to precondition the arrays. After these tests, the LUNs were reset on both systems. The custom workload consisted of two scenarios: one for read and another for write operations assigned to each of the ports.

For the comparative limit benchmark tests, both arrays were tested against the following parameters: request size, degree of data reduction, and read/write ratio. It was deemed important to test with deduplication turned on because it was a key component of the cost justification of the flash-based arrays. Each run of new data patterns was preceded by preconditioning.

For the application workload tests, a custom Virtana Storage Load Testing workload was based on custom requirements and statistical characterization of the existing production storage workloads. The access pattern consisted of 67% random write operations and 33% random read operations. Write operations wrote unique compressible (5:1) data to the database regions.

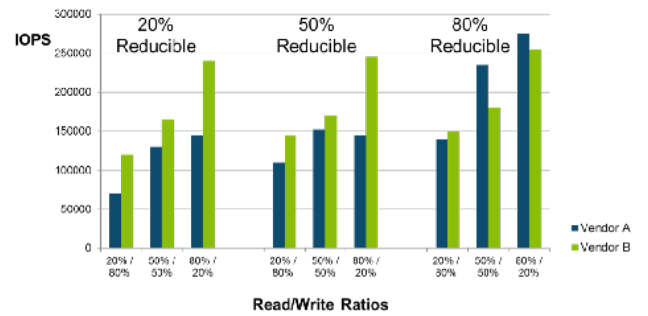


Figure 1: Flash array comparison, showing IOPS

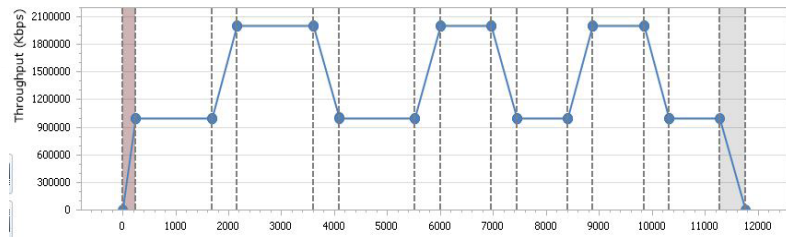


Figure 2: Load profile used by each port

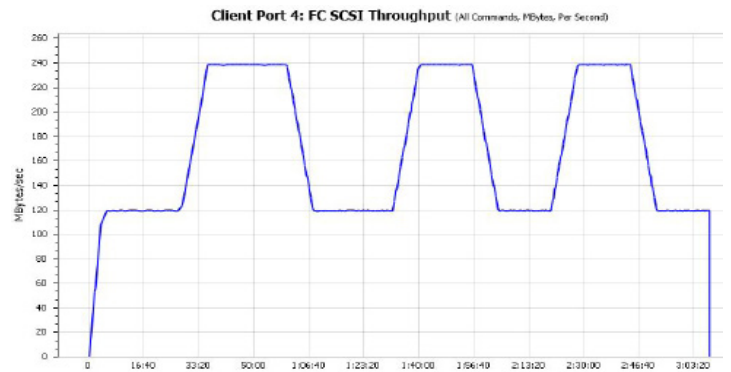


Figure 3: Improved throughput results (above)



CUSTOM APPLICATION WORKLOAD TEST RESULTS

For the application load profile tested (Fig 2), vendor A's array was able to exceed the current workload profile and achieve up to 240 MB/sec (Fig 3), while Vendor B's array topped out at approximately 120 MB/sec (Fig 4). Thus, it could not meet the required throughput demands of the application workload.

These comparative limit tests showed some advantage of Vendor B in the case of non-deduplicable data patterns, and an advantage of Vendor A in the case of highly deduplicable and compressible data patterns. The custom workload test showed Vendor A capable of generating higher throughput (more IOPS) comparable with the peak load measured in production systems, and was the system selected.

“With Virtana Storage Load Testing, architects can now easily identify performance limits for their unique workloads and determine the strengths and weaknesses of any networked storage array,” said a Chief Scientist at the Healthcare System.

