

New York Presbyterian Hospital



“ With WorkloadWisdom, architects can now easily identify performance limits for their unique workloads and determine the strengths and weaknesses of any networked storage array.”

Howard Marks
Chief Scientist

“We wanted to test certain ‘smart’ storage arrays, that support dedupe and compression; therefore lometer and similar tools were not appropriate.”

Storage Engineer
Healthcare Organization

WorkloadWisdom enables leading healthcare provider to select optimal flash storage array that matches application I/O profiles

Storage and storage network performance is becoming critical to the healthcare industry. Healthcare

storage infrastructure must keep up with bandwidth- demanding applications, a growing user community, and access to all of this information from potentially dozens of remote sites. Doctors, patients, and hospital administrators all assume that medical and insurance records will be online and available with good response times. Downtime or poor performance of the storage infrastructure can cause delayed critical healthcare—or even worse—lost lives.

To keep pace, storage architects within the Healthcare industry must look at the adoption of new storage technologies that are reshaping how data centers will be architected to support the huge explosion of electronic health records and medical imaging data. Storage validation is becoming a key component to cost-effective and responsive storage system rollouts. The primary goals are to reduce the risk of organizational interruption (outages) and to ensure the right product and amount of product is acquired. More specifically, the evaluation of storage infrastructure should include modeling the production application workload environment as accurately as possible. It should also enable the ability to pre-determine the performance limits of the storage system so that the next storage upgrade can be a carefully planned event instead of a disruptive fire drill.

Customer Challenge

This New York area 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. NY Presbyterian 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.CGH



WorkloadWisdom Solution

WorkloadWisdom storage performance validation hardware, software, and professional services were introduced via a services engagement. A test project was co-created that (1) benchmarked performance under various workload parameters, and (2) Implemented blended workloads that were representative of the actual production environment.

Performance Comparison Process

The customer worked with our Professional Services team to define the tests, deploy the WorkloadWisdom appliance, 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 the WorkloadWisdom appliance.

- 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 WorkloadWisdom 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 WorkloadWisdom 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.

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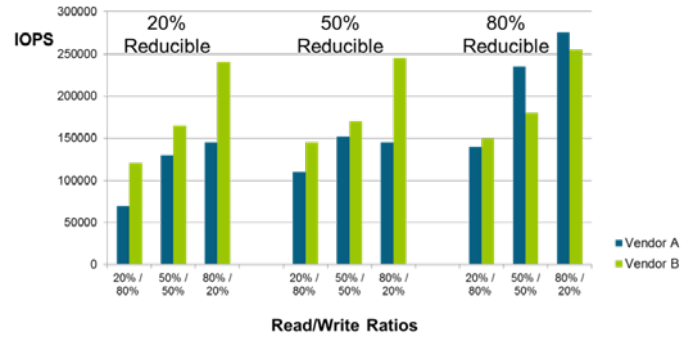


Figure 1: Flash array comparison, showing IOPS

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 MBytes/sec (Fig 3), while Vendor B's array topped out at approximately 120Mbytes/sec (Fig 4). Thus, it could not meet the required throughput demands of the application workload.

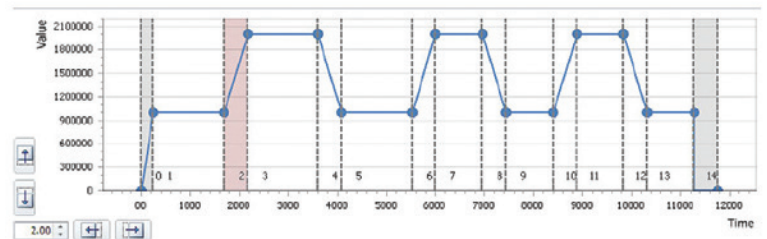


Figure 2: load profile used by each port

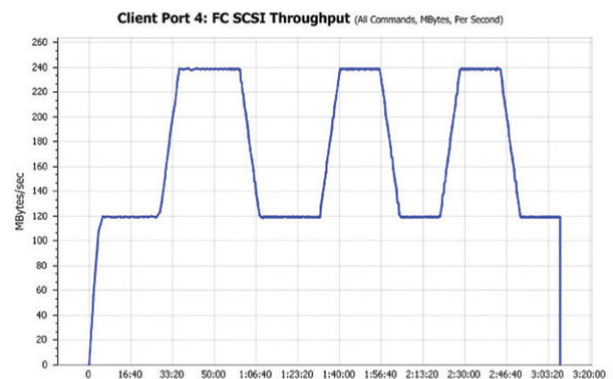


Figure 3: Vendor A results (above)

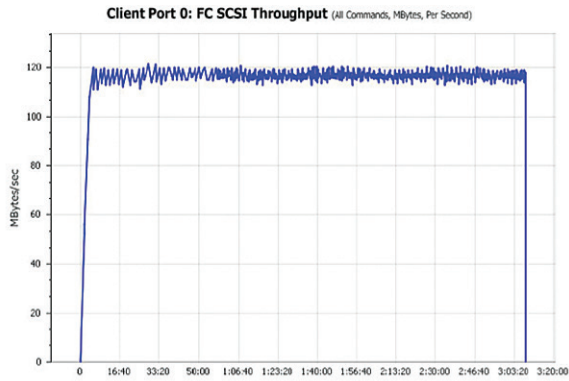


Figure 4: Vendor B results (above)

Benefits

The WorkloadWisdom tests validated the arrays and configurations that would offer the best performance, and mitigated the risks of deploying the new arrays into the production datacenter.

The storage engineering team gained full confidence that the flash-based storage system being selected can support the workloads in their production datacenter.

Summary

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.



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