Network Appliance™ Filers

Competitive Fibre Channel Performance

Comparing NetApp FAS Storage with EMC CLARiiON Arrays Using Cached Read Performance

Stephen Daniel | April 26, 2004 | TR-3321

WHITE PAPER

Network Appliance technology and expertise solve a wide range of data storage challenges for organizations, adding business value and enabling them to create and sustain a competitive advantage.

Abstract

This paper compares the Network Appliance FAS line of storage systems to EMC CLARiiON storage systems using cached read workloads as a metric of performance.

Preface to the Reader

Network Appliance continues to evolve its technology and products at a fast pace, with significant new systems and performance enhancements introduced every nine months or less over the past three years. This paper reflects the product characteristics and performance at the time of publication. In particular, current NetApp storage appliances supersede the model numbers referenced in this paper, for current storage appliance cached performance characteristics contact Network Appliance Inc.

Introduction to Storage Performance Metrics

Fibre Channel storage subsystems are complex computing systems. Because each system has its strengths and weaknesses, no single figure of merit captures the relative performance of storage systems across all workloads. However, customers beginning the process of choosing a storage system desire access to simple metrics that will allow them to select a small set of storage systems for further study.

Storage system vendors tend to resist simple characterizations of their systems. Such metrics often do not cover the range of performance optimizations available to storage systems, nor do the absolute numbers offer any prediction of actual application performance. However, in response to consumer demand, many SAN array vendors have begun to make available the cached read performance as a figure of merit.

Cached read performance metrics come in two basic types.

> **Cached read IOPS** is a count of the number of read requests that a storage system can satisfy in a second when the data being read is already in cache in the storage system. In order to focus on the per-operation overhead, cached read IOPS is always reported using the smallest possible transfer, 512 bytes.
>
> **Cached read throughput** reports the maximum number of bytes per second that can be retrieved from the storage system's cache. To focus this metric on total throughput and minimize the per-operation overhead, large reads are used. Typically these reads are 128kB or more per operation.

Cached read metrics function as crude measures of the processing power of a storage system. They do not measure the capability of the system to perform disk I/O, nor do such metrics measure the storage management capabilities of a storage system in any way.

Cached Reads per Second

Figure 1 compares the EMC CLARiiON family of storage systems to the NetApp FAS storage systems using cached 512-byte reads per second.

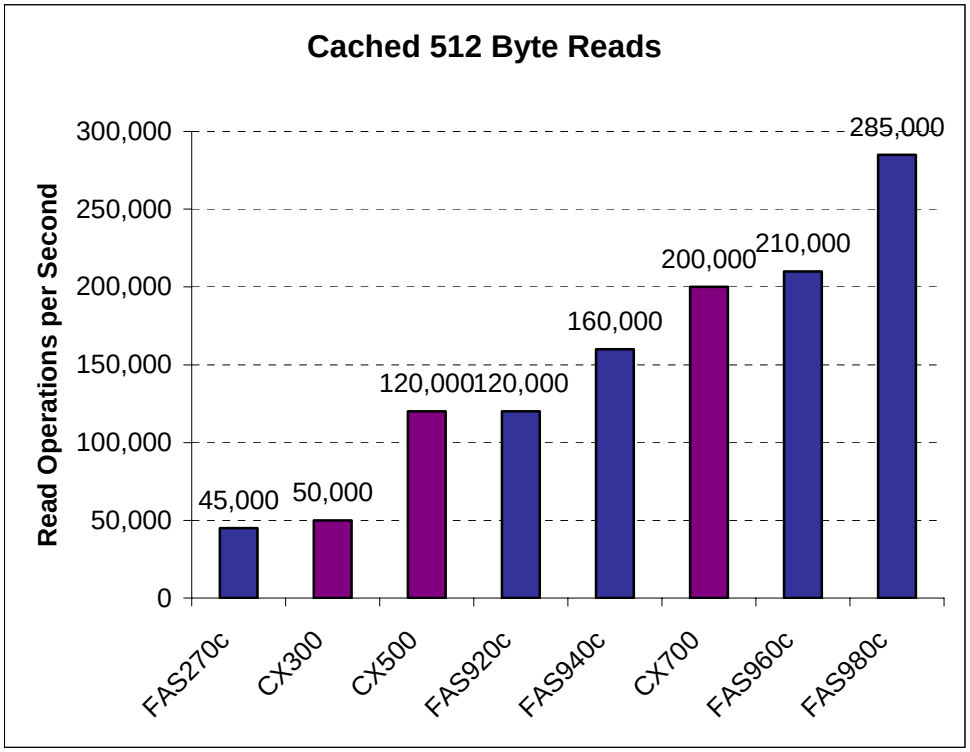

Figure 1) Cached 512-byte reads.

As shown in Figure 1, Network Appliance offers a range of Fibre Channel SAN products with performance ranging from under 50,000 reads per second to nearly 300,000 reads per second.

Cached Reads Throughput

Figure 2 compares the EMC CLARiiON family of storage systems to the NetApp FAS storage systems using cached read throughput.

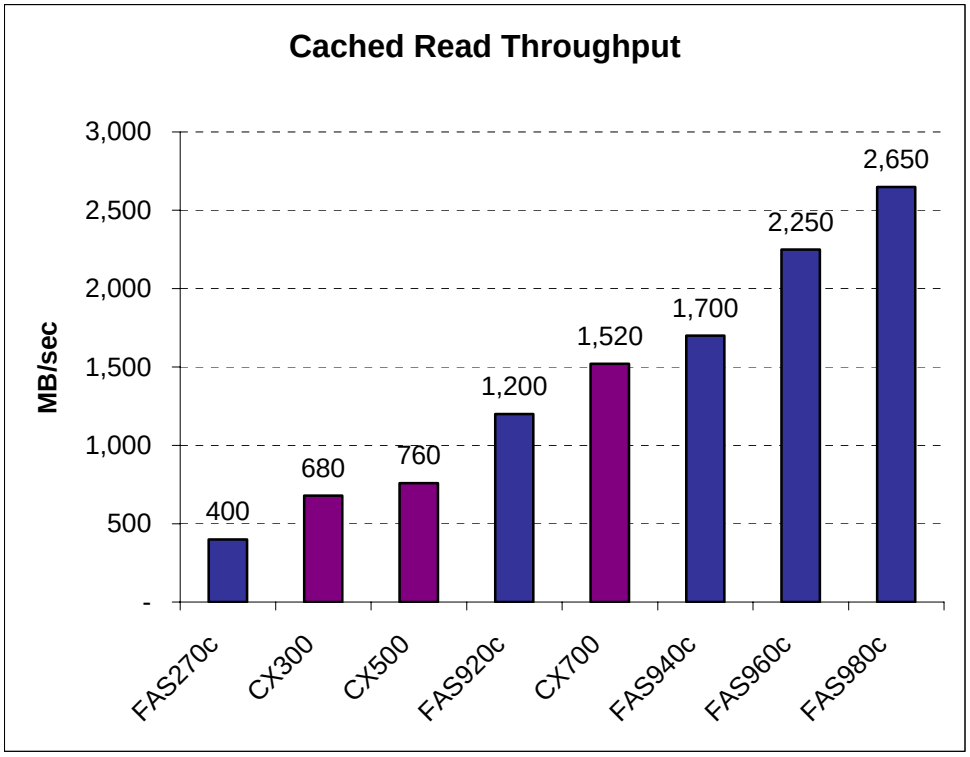

Figure 2) Cache read throughput.

As shown in Figure 2, Network Appliance offers a range of Fibre Channel SAN products with cached read bandwidth ranging from almost 400MB/sec up to 2500MB/sec (2.5GB/sec).

Discussion

Cached reads are a measure of raw system capability. Real applications are rarely read only. Few applications use block sizes as small as 512 bytes. Almost all applications access data sets large enough so that some data is read from disk, not from cache. As a result, customers will typically experience lower I/O throughputs than those shown in this chart. This will be true regardless of the storage system used, EMC CLARiiON or NetApp FAS.

Conclusions

Network Appliance offers a line of unified fabric-attached storage systems. These systems are sized to deliver a range of performance depending on customer needs. The Network Appliance line of FAS storage devices includes devices that span a broader range of performance than the current EMC CLARiiON product line.

References and Notes

The Network Appliance performance data is taken from various internal benchmarking projects. While every effort has been taken to ensure the data is correct as of April 22, 2004, these are measured results, not product specifications. These results are subject to change without notice. Network Appliance is not responsible for any errors that may be contained in this data.

Throughout this paper, Network Appliance uses the term MB/sec to mean 1,000,000 bytes of application data transferred per second.

All CLARiiON performance data is taken from *www.emc.com/products/systems/cx_compare_357.jsp* on April 5, 2004.

A disk-intensive workload comparison of NetApp FAS and EMC CLARiiON was performed by the independent lab Veritest and is available at this URL: *www.veritest.com/clients/reports/netapp/netapp_f825c.pdf*.

NetApp®

Network Appliance, Inc.
495 East Java Drive
Sunnyvale, CA 94089
www.netapp.com