

## NETAPP SAN EFFICIENCY

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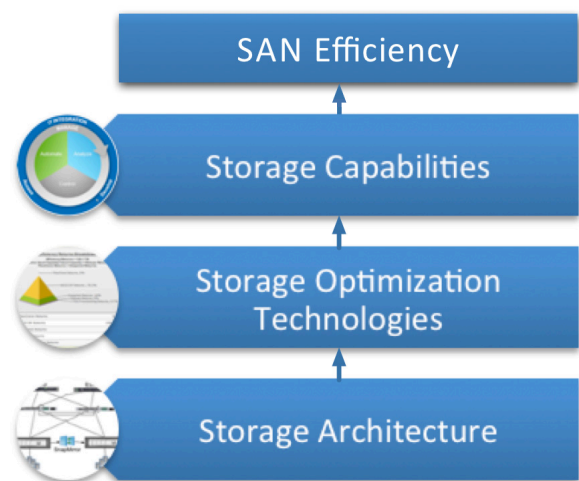
Today's data center is steadily riding a wave of change toward increasing efficiency through the flexibility and consolidation unleashed by virtualization. But too often, a look around the data center makes it obvious that storage hasn't come along for the ride. The reason storage has held out against the onslaught of change in every other domain of the data center is because it is such a precious, heavily used resource, with IO limits pushed to the wall and capacity constantly under pressure.

The proposal that more efficiency could be gained by consolidating more of this heavily used resource onto fewer systems, seems reposterous.

Indeed, success in driving IT efficiency to new levels takes a different approach. The domain of the infrastructure most in need of that new approach is storage – while the rest of the infrastructure has steadily been released from the constraints of physicality and poorly utilized compute, storage in many cases hasn't come along on the efficiency ride. Increasing storage efficiency in the data center is simultaneously about increasing flexibility, ease of use, and storage density, while delivering the same or more performance than before. And there are not too many vendors equipped with the wherewithal to make such a thing happen - driving efficiency to new levels with such a resource may be riddled with risk and complexity that could make the best of storage systems fall apart.

When it comes to block storage, there have been few advances that have improved efficiency across the long history and multiple generations of products in the market today. With the idea of low latency, high throughput, resiliency, and highly controlled use in mind, primary IO has remained mired in a world of inefficiency ruled by separation, isolation, over-provisioning, and sprawl.

NetApp has long claimed their FAS platforms are differentiated when it comes to efficiency. The claims are rooted in more than just a one-trick pony algorithm or bolt-on feature, but rather are built on a top to bottom architecture that is designed for performance, capacity, and storage feature optimization throughout. But as most readers realize, NetApp® FAS has long been about far more than serving up a single type of storage - FAS has long been the defacto flag bearer for *unified storage*, the idea of delivering both block and file access over nearly any protocol required. In our opinion, to bear the standard for the idea of "unified" storage, a vendor better not limit features or optimize one type of storage better than another. Nor does NetApp claim to do so. In fact, they claim that their efficiency features are so unified within the FAS platform that they deserve to carry the mantle of leadership for SAN Efficiency - the idea that FAS storage sets the bar for efficiency in terms of management, utilization, and performance.



**Our hands-on examination looked at each layer of NetApp's storage technology that adds up to a top to bottom integrated recipe for storage efficiency.**

In a recent Technology Validation exercise, Taneja Group set out to take a look at the NetApp FAS family of storage, to explore what capabilities make up the NetApp SAN efficiency story, and examine how (and whether) they are set apart in the industry. Within the heart of a NetApp FAS, there's an efficiency story a bit unlike any other - while the industry often concludes that efficiency is made up of capacity, and how much IO can be served up to workloads by a given storage controller and with a given set of disks, NetApp proved to us that there is far more to this story. Efficiency is also at least as much about how the underpinnings of a system enable capacity and performance efficiency to be turned into more efficient storage capabilities - things like instant cloning, snapshot efficiency, and more - and how those capabilities serve as the basis for management efficiency. Just like this sounds, SAN efficiency is a multi-part story, made up of the many different technologies and capabilities within a NetApp FAS that all work with one another in building block fashion to enable real efficiency.

**Our hypothesis in this technology validation exercise:** *NetApp FAS storage has the right underpinnings for efficiency that serves as a foundation for a wide-range of storage optimizing technologies on top. With those storage optimization technologies in tow, NetApp FAS storage systematically enhances the versatility of the underlying storage by letting organizations in effect do more with less, while doing it with greater ease.*

To test our hypothesis, we turned our eye toward examining the architecture of NetApp FAS storage and the various efficiency-enhancing optimization technologies. We then walked through a series of hands-on tests, using VMware ESXi virtualized Microsoft® Exchange, to call out where we see efficiency gains happening in the real world, and how efficiency turns into storage capability.

**OUR HIGH-LEVEL FINDINGS:**

- NetApp proved a competent platform for optimizing our storage interactions in terms of both capacity and performance. During testing, we switched capacity on and off, pushed a limited set of drive spindles to the saturation of their performance, and then put into place other performance optimization tools like NetApp Flash Cache. NetApp proved to us that they have the right underpinnings to make all of these technologies perform efficiently and with full data integrity, even while we were pushing an abusive set of IO - including multiprotocol storage behind virtual desktops, Microsoft Exchange, multiple instances of IO Meter, and more.
- Moreover, that architecture is the foundation for every NetApp feature and capability that we reviewed in our hands-on evaluation, from deduplication that optimizes disk use, cache use, and WAN bandwidth use, to the unified and virtualized coexistence of many storage protocols and volumes on a single system that is managed by a sophisticated full storage lifecycle automation.

Like no other vendor around, NetApp paints a picture of what complete and unified storage really is. It is about far more than any single feature or mechanism. It is instead about how each feature works together with the other features and capabilities to create storage that is more than the sum of the parts. That total efficiency has a significant impact on the Total Cost of Ownership for a storage infrastructure. These details and more can be found in the full report available here:

<http://www.netapp.com/us/library/analyst-reports/ar-taneja-group-san-efficiency.html>

Technology Validated	Storage Efficiency	Contributes to Human Efficiency	Total Cost of Ownership Impact
Storage Architecture	✓		✓
Capacity Optimization	✓		✓
Performance Optimization	✓		✓
Access Optimization	✓		✓
Resource Optimization	✓		✓
Snapshot, FlexClone, and SnapMirror	✓	✓	✓
Management Technologies	✓	✓	✓

**NetApp’s efficiency recipe adds up to more than just storage capability, but also fundamentally impacts the efficiency with which storage is operated inside the data center.**