WHITE PAPER

nimblestorage

Scale-to-Fit Storage

Grow Storage Seamlessly with Nimble Storage's Scale-to-Fit Design

This paper explains how Nimble Storage solutions cost-effectively scale to customers' specific capacity and performance requirements. Customers can non-disruptively and independently scale capacity, cache, or compute; or combine multiple arrays in a scale-out storage cluster.

Matching storage infrastructure to application requirements is an ongoing challenge. Data growth continues to accelerate and new applications are launched to support the needs of the enterprise. What can IT do when Microsoft® Exchange™ users ask for larger email boxes or when virtual desktop users complain about slow response?

With traditional storage solutions, IT often must choose between maximizing capacity or optimizing for performance. As needs change, it can be both disruptive and expensive to scale capacity and performance. In many cases, the only options are either to embark on a forklift upgrade to a higher-capacity, higher-performance storage solution, or to deploy a separate storage silo for a given application or data set. In some cases, it may be possible to expand an existing array, but it isn't cost effective to do so because the vendor charges additional software licensing fees for increasing the storage capacity.

In contrast, Nimble Storage's scale-to-fit design enables customers to buy what they need, when they need it. Customers can scale storage capacity, performance, or both—affordably and seamlessly—with no planned downtime. There's no need to rip and replace anything, no new silos to manage—just a seamless growth path that fully protects a customer's existing storage investment and makes it easy to address changing storage requirements.

Scale Capacity

Scaling storage capacity in a Nimble Storage array is as easy as adding external disk shelves. Each shelf includes HDDs and an SSD for cost-effective storage delivering high throughput. IT can extend each Nimble Storage array with up to three external disk shelves, mixing and matching shelves of different capacities as needs require.

Whether to support growing SharePoint workloads or larger Exchange mailboxes, Nimble Storage customers can add disk shelves non-disruptively. In addition, IT can manage the entire Nimble Storage array—including the added capacity—from a single console, using Nimble Storages intuitive management console.

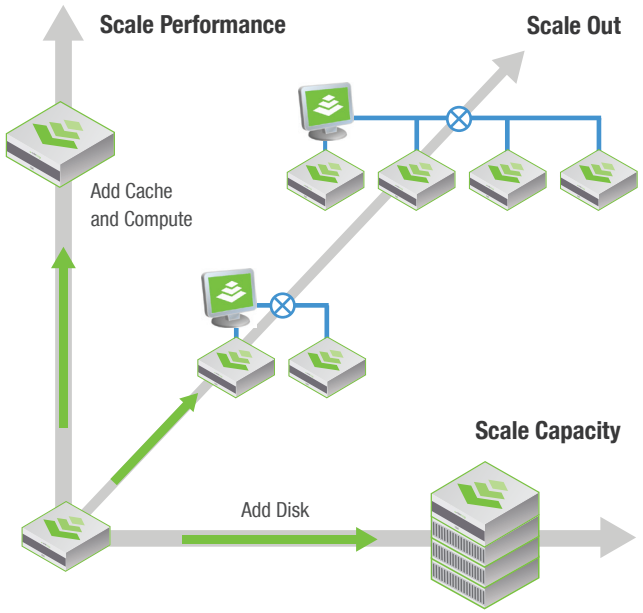

Figure 1: Scaling capacity, performance via upgrades, and scale-out clustering

Scale Up Performance

Storage has a big impact on application performance. If storage performance is suffering, it can degrade the response times of database queries, virtual desktop infrastructure (VDI), and other demanding applications. Scaling storage performance requires boosting the number of I/O operations per second (IOPS) that the system can perform while keeping read and write latencies low.

Nimble Storage offers customers two means of scaling up storage performance. Performance can be boosted by upgrading compute power, or by increasing the amount of cache memory.

Compute power can be easily increased by upgrading a CS-Series array with a more powerful controller. This additional processing can be used to scale the performance of existing workloads or to accommodate new workloads. In addition, IT can boost storage performance by upgrading the amount of flash on the array using additional SSDs. Increasing the cache allows for larger amounts of active data to be served up immediately, boosting end user response times. Both controller and SSD upgrades can be done without any scheduled downtime.

Scale Out Seamlessly. Manage Simply.

A storage cluster is ideal for customers supporting demanding enterprise workloads, and looking to consolidate storage resources for greater operational efficiency.

With Nimble Storage, performance and/or capacity can be expanded beyond a single array. As many as four Nimble arrays can be clustered and managed as a single storage entity. Scale-out clusters can include any combination of Nimble CS-Series arrays; and individual components, like arrays, disk expansion shelves, or all-flash expansion shelves can be added or removed as needed. Nimble allows for all storage resources to scale seamlessly, allowing organizations to meet the ever-changing needs of their critical applications without disruption.

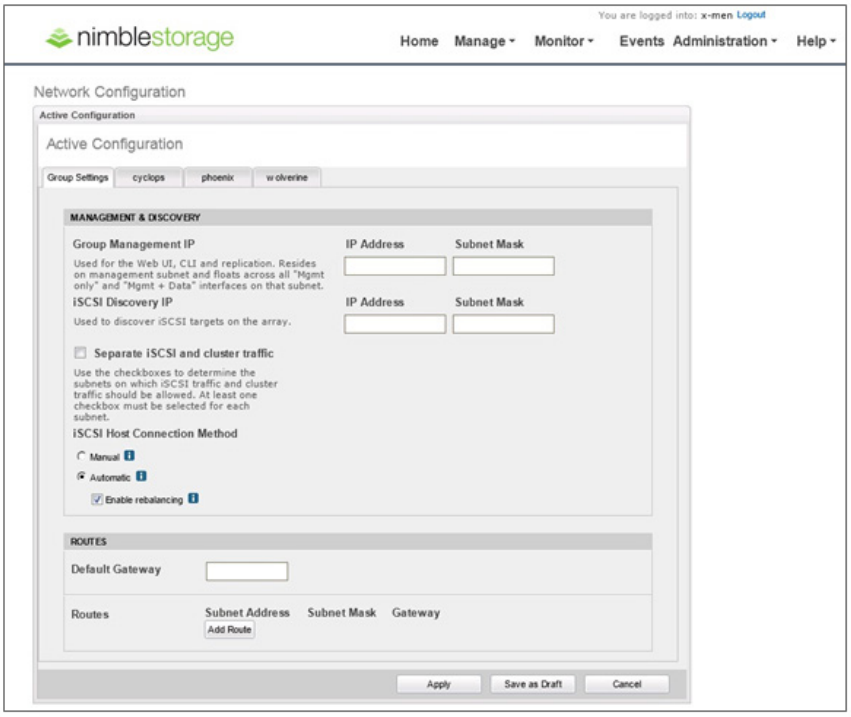

Figure 2: Easy configuration of network settings for the entire storage cluster

Nimble Storage's scale-out architecture enables tremendous simplicity across all of the processes involved with configuring and managing scale-out storage. In grouping together multiple Nimble Storage arrays, no special networking configuration is necessary; Nimble Storage host tools also automatically configure and manage host connections and paths to data, creating a direct parallel access to data on the storage group. This simplifies IT's job and eliminates the overhead of manual connection setup to individual arrays. Indirect parallel access to the hosts is automatically configured to direct reads and writes to the correct array, avoiding any forwarding. For this method of access, the hosts run the Nimble Connection Manager for Windows™ or PSP plug-in for VMware® vSphere™.

Nimble Storage's scale-out architecture also supports two additional types of host connections. The first is single-point access connections, in which a selected array forwards non-local reads and writes to the correct array on behalf of the host. And the other is parallel access, in which each array in a group forwards non-local reads and writes to the appropriate array. Hosts require no change for either single-point or parallel access.

Continuous Operations

A Nimble Storage scale-out array group can be logically divided into pools of storage. Individual arrays are the building blocks of storage pools; that is, a pool consists of one or more arrays across which data is striped. IT can automatically migrate volumes between different pools in a group without any disruption to active workloads. This eliminates down time for users when maintenance or other management tasks would otherwise require a standalone array be taken offline.

IT can easily expand or shrink storage pools. For example, if a new array is added to a group, it can either be set up as a separate pool or used to seamlessly expand an existing pool. Nimble Storage automatically rebalances data across pools as they grow or shrink, maximizing the utilization of common resources such as network connectivity. Similarly, if IT adds a disk shelf to an array in a storage group, the added capacity will be trigger transparent rebalancing across the pool to which the array belongs with no disruption to applications or users.

Simplified Management

All of the Nimble Storage infrastructure, including scale-out groups, can be managed from the Nimble Storage management console. With its intuitive interface, templates and automation, IT can perform all tasks for a scale-out storage group from one pane, as if it were a single storage entity.

Such tasks include:

- Adding or removing an array
- Creating and managing individual pools and volumes
- Getting status information
- Generating capacity and performance reports

In addition, all operational tasks can be done non-disruptively, including adding/removing an array, upgrading a controller, expanding or shrinking a pool, migrating a volume, and other tasks.

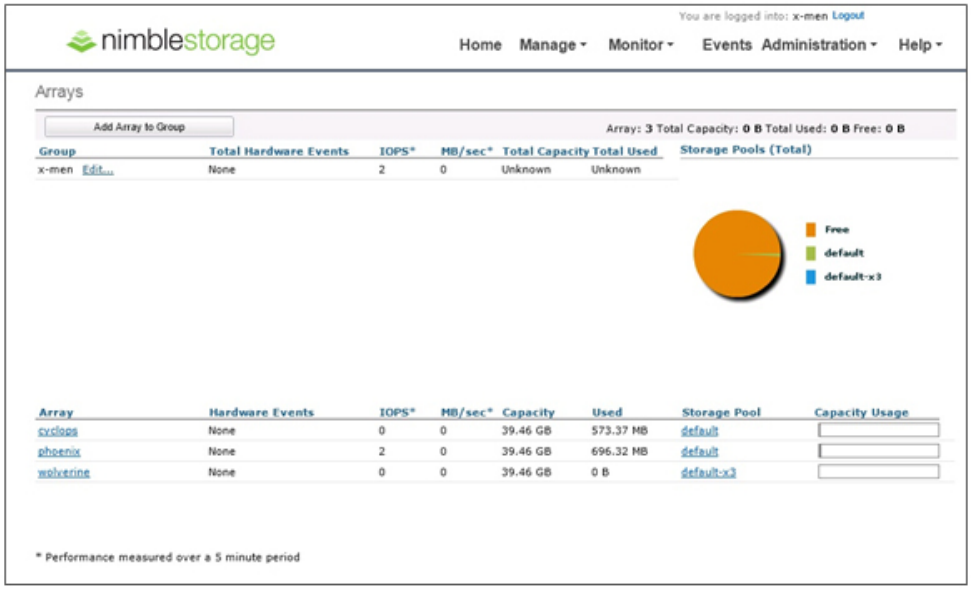

Figure 3: Intuitive, single pane-of-glass management for the entire scale-out group

Linear Performance Scaling

As nodes are added to a scale-out storage cluster, performance scales in a linear fashion. This is a function of the dynamic load balancing performed on the host side, which ensures that read and write operations are directed to the appropriate array in the group. Data is finely striped across nodes, allowing applications to fully leverage the collective hardware resources of the group.

Easy Data Replication

Nimble Storage's scale-out architecture supports remote replication of individual volumes, which gives IT granular control over which data to replicate. For example, in a VDI deployment, IT can opt to replicate user data only, since desktops can be easily recreated. Customers benefit from easy, affordable disaster recovery that is ideal for specific applications.

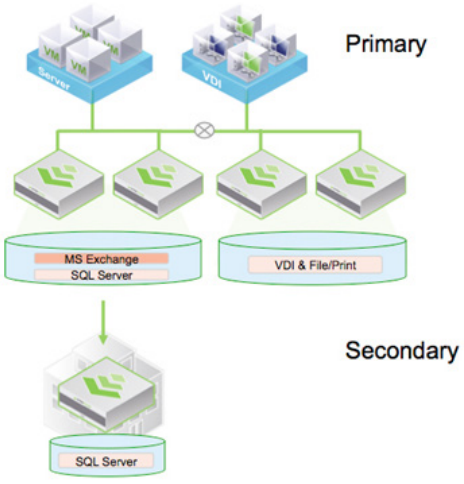

Figure 4: Scale-out supports remote replication of volumes

Putting Scale-Out Storage to Work

Nimble Storage's scale-out architecture delivers the flexibility to dynamically change storage capacity and performance as business needs change. Here are common use cases for scale-out groups:

- Accommodate application growth or new workloads such as VDI, SQL, Exchange, virtual servers, or Oracle by adding another Nimble Storage array to an existing scale-out group
- Combine workloads with complimentary performance and capacity needs by merging two storage pools into a larger pool. This effectively load balances by leveraging the processing and capacity resources across all arrays in the pool
- Plan ahead for new workloads or performance growth by migrating volumes from one pool to another pool that has more cache, compute and capacity (coming in a later release)
- Remove an array from an existing storage group either for a hardware refresh, redeployment as needed for other workloads
- Replicate individual volumes from a storage pool in a scale-out group at a primary site to either an array or a smaller pool for disaster recovery

Nimble Scale-to-Fit Advantages

Nimble Storage's scale-to-fit design gives IT tremendous flexibility to scale storage capacity and performance and to reconfigure their storage infrastructure as needs change. This innovative approach eliminates storage silos and preserves customer investment. It also eliminates down time by allowing IT to easily perform numerous operations non-disruptively.

Next Steps

To learn more about Nimble Storage scale-to-fit storage solutions, please contact a representative at 1-877-364-6253 or visit www.nimblestorage.com.

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