

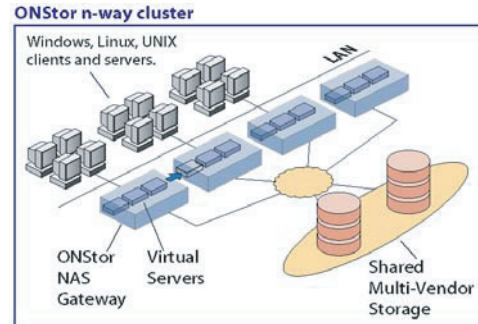
## The Case for ONStor Clustering

### Benefits of Clustering

Clustering technologies help determine the two most critical attributes of an enterprise-class storage system: scalability and availability. Scalability determines the system's ability to grow as needs change, while availability ultimately determines the system's uptime.

Both are essential to meeting your business objectives. And both benefit from the flexible management framework that clustering provides:

- **Availability:** Clustering allows one device to failover to another, thus eliminating single points of failure.
- **Scalability:** Advanced clustering designs permit multiple paths to data. These flexible data paths allow seamless growth (the ability to add bandwidth without application or client disruption), and quick resolution of performance bottleneck issues.



### What are ONStor Clusters?

ONStor clusters are comprised of two, three, or four NAS Gateways. The NAS Gateways themselves are interconnected by an Ethernet link that distributes a “heartbeat” and facilitates information sharing among the devices. All NAS Gateways in the cluster share access to a pool of FC attached storage that may be accessed via a SAN or direct attach.

### Unique Attributes of ONStor Clusters

While clustering provides benefits in any server environment, there are unique features that make clustering especially beneficial in the ONStor environment.

**Virtual servers:** A powerful management tool, virtual servers provide scalability not found in any other NAS. With virtual servers, performance “hot spots” can be addressed instantly simply by redistributing virtual servers among the NAS Gateways. Performance can be added when and where it's needed – without ever disrupting clients or migrating storage – simply by adding a NAS Gateway. This ability to move load around (at any time, and between any devices) enhances resource utilization. Never again will one NAS device sit idle while the next device over suffers from excessive workload. And never again will users be forced to tolerate a system that delivers poor response times.

**Single pool storage:** Because all NAS Gateways in the cluster share a single pool of storage, all unused capacity is available to any of the devices. Capacity can be automatically provisioned, on-demand, to whichever device requires it. Management costs fall while storage utilization climbs.

**Linear performance scaling:** In most clustering architectures, performance growth is not linear. That is, the fourth unit added to the cluster will not deliver the same throughput as the first unit. With ONStor, growth is linear, meaning that each NAS Gateway delivers the performance you're paying for and the performance you predict.

**Full Active Architecture:** All devices in an ONStor cluster are available both for active data movement and for failover from other devices. This “active-active” architecture eliminates the resource waste of “active-passive” architectures that require a device to remain on standby until needed for failover purposes.

**Redundancy with flexibility:** A pair of ONStor NAS Gateways provide system redundancy. One can fail over to the other to eliminate system downtime. When more NAS Gateways are deployed, the advantages grow further. Flexible failover allows an inactive device to failover virtual servers from one device to multiple devices. So load remains balanced across all active devices, thus optimizing performance in a failover scenario. No other NAS clustering architecture provides this flexibility.

**Multi-Vendor, Multi-Tiered Storage:** Not all data necessarily belongs on the same class of storage. ONStor clusters allow different types of disk (SATA or FC disk) within the same storage pool, so data can be easily deployed on the class of storage that makes sense for the application. Storage from multiple vendors can also be mixed, further enhancing storage utilization and cost savings.

## The Case for Clustering with ONStor

A single ONStor NAS Gateway delivers highly cost effective file services from multi-vendor storage. But the power of the ONStor technology really becomes apparent when clustering is deployed. Here, the benefit of virtual servers, single pool storage, and flexible load balancing effectively boost performance and availability while driving down costs.

Cost savings are tangible with clustering:

- Increased performance for better user productivity.
- Reduced downtime with system redundancy.
- Simplified maintenance: When firmware updates are required, a cluster permits all workloads to be transferred from one device to the other. The offloaded device can then be taken out of service for non-disruptive maintenance.
- Predictable service levels: With a single NAS device, all workloads are by definition shared. In this setting, service levels become hard to ensure since any task can consume resources and drag down the performance of critical tasks. ONStor clustering eliminates that issue by allowing critical workloads to be isolated on a specific device. Service levels can now be guaranteed.
- Load balancing: File services traffic can be “bursty” in nature. Clustering allows hot spots to be addressed by redistributing workloads. This optimizes both resource utilization and user satisfaction.

For some system administrators, an enhanced user experience is clustering’s most tangible benefit. Many ONStor customers report that users are delighted to find that the system “just got faster”. But whether the goal is happier users, reduced management expense, or better resource utilization, ONStor clustering provides exceptional return on investment.