VERITAS™

Realizing the True Potential of Software-Defined Storage

Who should read this paper

Technology leaders, architects, and application owners who are looking at transforming their organization's storage infrastructure to be more agile and resilient.

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Understanding Software-Defined Storage

As enterprise data centers strive to provide a high level of service for their internal customers and applications, there is the constant underlying goal to do so at reduced complexity and cost. However, meeting those goals without sacrificing performance or availability has so far been elusive.

One common approach is to use a converged architecture based on flash arrays. This option offers high performance with a simple install, but it also has high costs. Another approach is using a scale-out software-defined storage solution to utilize direct attached storage (DAS) for reduced cost. However, this approach lacks built-in data and application management functionality which often results in complex point solutions.

The Veritas answer to software-defined storage, Veritas InfoScale™, provides a full suite of data and application availability tools in a single solution to bring performance, availability, and flexibility to the data center. Combined with unmatched read and write capabilities from solid state devices, enterprises can achieve results at a much lower cost than the alternatives.

Software-defined storage represents everything Veritas has been doing and innovating in the storage space for the past 20 years. Our definition of software-defined storage is probably broader than what you've heard from other vendors or industry analysts. It starts with a strong software-defined storage backbone and key elements such as:

• Storage virtualization
• Quality of service (QoS)
• Leveraging in-server storage functionality
• Advanced storage capabilities
• Automation
• Scalability
• Vendor and hardware agnostic

Other vendors' solutions might touch a few of the aspects listed above, but we believe it's essential that a strong software-defined storage strategy encompass all of them.

There are distinct benefits with this broader definition of software-defined storage including greater agility and enhanced QoS, because you can utilize major platforms such as Linux™ and Windows®, and any major hardware vendor. By using just one Veritas solution to manage different types of storage, including spinning disks, solid state drives (SSDs), storage area network (SAN), direct attached storage (DAS), just a bunch of disks (JBOD), and more, you'll simplify storage management while reducing costs. You can reduce total cost of ownership (TCO) even more with our approach of using a cluster of standard servers that leverage high performance server-side storage devices while providing shared storage capabilities.[1]

1. Carrero, Carlos, "Software defined Storage at the Speed of Flash", http://www.symantec.com/connect/blogs/software-defined-storage-speed-flash

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The strong innovations in storage from Veritas mean we have the depth of expertise and innovation to help you realize the many benefits of software-defined storage for your enterprise. In this paper, we'll discuss exactly what functionality to look for in a software-defined storage solution and why each is important.

Realize Better Performance with Storage Virtualization

Software-defined storage boosts application performance by virtualizing back-end storage and transforming it into a pool of capacity that servers can utilize. This is the core functionality of Storage Foundation today and builds on storage functionality Veritas has provided for the past fifteen plus years.

Storage Foundation helps organizations adopt SSD technology and deliver storage quality of service at the application level, while improving return on investment. Unlike point solutions, Storage Foundation helps you manage your storage infrastructure in a centralized fashion so you can reduce operational costs and capital expenditures regardless of the storage vendor you use.

Ensure Quality of Service for Mission Critical Applications

Normally, all applications accessing data from the storage pool get the same level of storage performance. However, not all applications are 'born equal'– some are more mission critical than others. This raises an important question: how do you ensure business critical applications have a high QoS? This is where intelligent software, such as Veritas™ SmartIO, come in.

SmartIO uses granular, online caching to move reads and writes inside the server. It can be enabled at the block or file level to satisfy SLAs and applications' performance characteristics without manipulating the architecture or requiring downtime. It also ensures quality of service at the application level while optimizing the storage footprint through high-performance, in-server storage. With Smart IO, you can achieve up to 400 percent performance gains while reducing traditional storage area network (SAN) costs over 80 percent.[2]
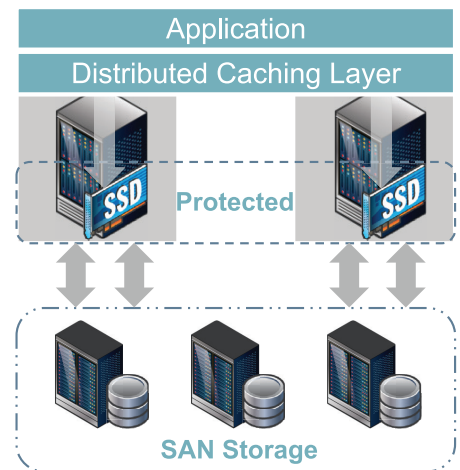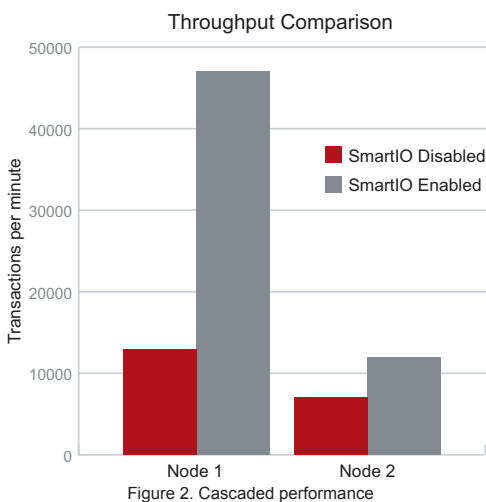
Figure 1. SmartIO provides intelligent application-level caching for high performance

Throughput Comparison

- SmartIO Disabled
- SmartIO Enabled

Figure 2. Cascaded performance

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Leverage In-Server Storage Capabilities

Traditionally, a SAN is needed in order to provide high availability for data. When a node fails, data needs to be accessible to other nodes. With a powerful software-defined storage technology, like Veritas™ Cluster File System, direct attached storage is always accessible. Flexible Storage Sharing (FSS) is a feature of Cluster File System that enables any local device to be shared with other members of the cluster. FSS combines shared and direct attached storage for near-local read and write performance to and from remote disks. This results in a highly resilient configuration, extending traditional volume manager and file system capabilities to 'share nothing' environments.
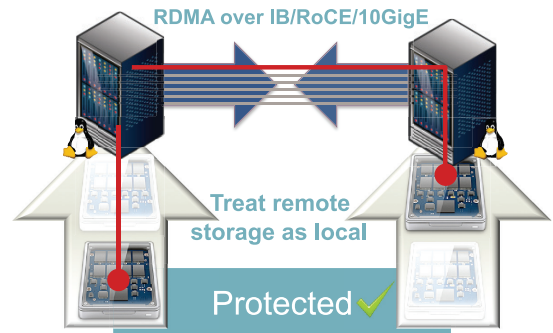

Figure 3. Flexible Storage Sharing (FSS) delivers performance without compromising on flexibility

FSS's 'shared-nothing architecture' helps organizations utilize DAS while experiencing 4x performance gain at 22 percent of the cost of traditional SANs.[3]

Benefits of the Veritas approach to flexible storage sharing include:
- **Flexibility**—Any type of storage can be used and nodes can be added and removed easily.
- **Reliability**—Sharing doesn't compromise reliability. Using data replication, multiple copies of the data are maintained across nodes so there's no data loss, even if a node goes down.
- **Support**—InfiniBand and Ethernet are supported as interconnects, which gives you flexibility in setting up your infrastructure. With InfiniBand you can realize multiple benefits including drastically increasing the interconnect speed and performance of your entire storage infrastructure.

Safeguard Data with Advanced Storage Services Capabilities

Software-defined storage solutions should include advanced services such as storage tiering, dynamic multipathing, thin reclamation, deduplication, compression, embedded cache for solid state devices, and more. The advanced storage services from Veritas can be delivered across any platform, whether Linux, Windows, or virtual machines.

Veritas advanced storage services include:
- **Built-in deduplication and compression** reduce your primary storage footprint.
- **Increased storage utilization** across heterogeneous environments improves usage and efficiency across all major operating systems.
- **Automated storage tiering** seamlessly and transparently moves data based on business value.
- **I/O path availability and performance** efficiently spread I/Os across multiple paths for maximum performance, path failure protection, and fast failover.
- **Thin provisioning optimization** nondisruptively migrates data to thinly provisioned storage with the ability to reclaim capacity automatically.
- **Local and remote data protection** safeguards data across any environment with point-in-time copies, mirroring, and data replication.

3. Running Highly Available, High Performance Databases in a SAN-Free Environment, Symantec, https://www.symantec.com/content/en/us/enterprise/white_papers/b-storage-foundation-intel-joint-whitepaper-WP-21327636.en-us.pdf

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Simplify Storage Management with Automation

By using policies, software-defined storage simplifies management and helps storage administrators focus on higher level tasks rather than fixing immediate problems that can degrade SLAs.[4] Veritas InfoScale™ Operations Manager centrally manages application, server, and storage environments which results in faster application deployment and higher service levels, reduces errors, and provides visibility throughout your environment. Operations Manager can also identify and visualize potential application and storage problems by correlating health and status across multiple applications, servers, storage, and replication resources.

Ensure High Performance with Scalability

Software-defined storage should scale storage infrastructure without disruption to availability, QoS, or SLA performance.[5] Veritas Cluster File System can be mounted on up to 64 cluster nodes simultaneously, making it an ideal solution for application scale out while delivering optimum performance and data integrity. Flexible Storage Sharing also supports scalability by allowing the addition of up to eight storage and compute nodes.

Reduce Costs by Choosing Any Hardware Platform or Vendor

A software-defined storage solution should be hardware and vendor independent. Veritas solutions support any platform you're currently running or planning to use in the future. Benefits of this approach include reduced operational costs and capital expenditures across storage platforms–no matter which vendor you choose.

Next Steps

As you consider a software-defined storage solution, be sure to understand the critical features you need to truly harness its potential. For enterprises that require high performance without compromising flexibility or data availability, Veritas storage solutions maximize storage efficiency, data availability, operating system agility, and performance across heterogeneous server and storage environments at a lower TCO.

Learn more about Veritas software defined storage solutions:
  • White Paper: Software Defined Storage at the Speed of Flash
  • White Paper: Running Highly Available, High Performance Databases in a SAN-Free Environment
  • Data sheet: Software Defined Storage from Symantec and Intel: Applications in a Flash
  • Web: Veritas storage solutions

4."Software Defined Storage", Storage Networking Industry Association, 2015,
http://snia.org/sites/default/files/SNIA%20Software%20Defined%20Storage%20White%20Paper-%20v1.0k-DRAFT.pdf
5. Ibid.

ABOUT VERITAS TECHNOLOGIES LLC

Veritas Technologies LLC enables organizations to harness the power of their information, with solutions designed to serve the world's largest and most complex heterogeneous environments. Veritas works with 86 percent of Fortune 500 companies today, improving data availability and revealing insights to drive competitive advantage.

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