

# Scale Your Storage Solutions to Match Data Growth

Intel and VMware deliver adaptive software-defined storage solutions



IDC reports that the digital universe is doubling in size every two years, and by the year 2020, there will be more than 44 zettabytes of digital information worldwide.<sup>1</sup> For enterprises to remain successful amidst the onslaught of massive data, IT departments need storage solutions that are flexible, scalable, and cost effective. Unfortunately, traditional storage architectures often fall short of delivering on these capabilities, causing bottlenecks, underutilization, and application workload inefficiencies. Traditional storage methods also require a significant investment, create complex management tasks for IT departments, and lack the scalability required to keep up with data demands. Moreover, traditional storage systems are not easily re-provisioned on the fly, and they don't have the flexibility needed to adapt to fast-changing user and business demands. Server virtualization has transformed the way that IT is managed and delivered as it simultaneously places new demands on storage in terms of input/output (I/O) performance, latency, and scalability.



To address these storage challenges, Intel and VMware are working together to provide foundational technologies that deliver intelligent storage solutions based on the Intel® Solid-State Drive (SSD) Data Center (DC) Family, 10 gigabit Intel® Ethernet Converged Network Adapters, Intel® Xeon® processor E5 family, and VMware® Virtual SAN™. The software-defined storage of Virtual SAN, paired with Intel® technologies, can transform the data center from isolated systems with limited scalability and inefficient utilization to a dynamic, fully automated, and flexible infrastructure that encompasses servers, storage, and network components.

## Radically Simple Storage for Virtual Environments

Virtual SAN, embedded inside the VMware vSphere® kernel, utilizes a highly available architecture that can withstand failures at the disk, server, and network level with no data loss, using built-in redundancy mechanisms that transparently store multiple copies of the data across disks and host servers. Virtual SAN uses a policy-based approach to storage management that allows IT administrators to specify storage attributes—such as capacity, performance, and availability—in the form of simple policies that are associated with individual virtual machines or virtual disks. Storage can then be instantly provisioned and automatically configured according to the assigned policies. Virtual SAN also dynamically self-tunes and load balances to meet the policies of each individual virtual machine, thereby adapting to ongoing workload condition changes and helping to ensure that service-level agreements (SLAs) are met throughout the virtual machine lifecycle.

Virtual SAN makes it easy to provision and manage storage for virtual machines. IT professionals can quickly provision storage directly from the VMware vSphere Web Client with just a few clicks, taking advantage of a self-tuning system that automatically optimizes itself to deliver the right SLAs based on the requirements for each virtual machine—without any downtime.

Unlike traditional storage arrays, Virtual SAN does not require large upfront investments to get started. A Virtual SAN data store can be created with as few as three servers and can be used on any server built on standard Intel Xeon processors.

Virtual SAN also delivers a lower total cost of ownership (TCO) by optimizing available performance and capacity on standard servers. Plus, Virtual SAN shares hardware resources used for capital expenditures, power, and cooling, which reduces energy costs. This means that existing high-dollar SAN devices can be freed up to perform the mission-critical work for which they were originally intended. Meanwhile, Virtual SAN enables organizations to increase their storage performance and capacity incrementally and predictably.

## **A High-Performance Storage Foundation**

When paired with VMware Virtual SAN, Intel technologies like the Intel Xeon processor E5 family, 10 gigabit Intel Ethernet Converged Network Adapters, and the Intel SSD Data Center Family, create the foundation for innovative software-defined storage solutions.

### **Intel® Xeon® Processor E5 V2 Family**

VMware Virtual SAN delivers an efficient, scalable, and cost effective software-based storage solution, but running multiple virtual machine workloads—whether compute or storage workloads—on virtualized servers requires sufficient processing capability and increased I/O bandwidth. The Intel Xeon processor E5-2600 v2 product family is designed to overcome this challenge with up to eight cores,

and built-in Intel® Virtualization Technology (Intel® VT) further improves the versatility of software-based storage solutions.<sup>2</sup>

Another built-in technology, Intel® Integrated I/O, helps remove server, storage, and network bottlenecks to decrease latency and increase data throughput while enabling energy-efficient performance for the most demanding workloads.

Running VMware Virtual SAN on servers built with Intel Xeon processors can reduce an enterprise's total cost of ownership (TCO) while increasing flexibility and scalability with intelligent, automated storage provisioning and management.

### **Intel® Solid-State Drive Data Center Family**

Intel SSDs have emerged as the ideal storage solution for data centers. SSDs have no moving platters or actuator arms that can fail, use semiconductor-based, non-volatile memory, which makes them superior to hard-disk drives (HDDs), and produce less heat and noise than HDDs.

The Intel SSD Data Center Family can retain data even with unexpected loss of power and balances fast read/write speeds with optimized CPU utilization. The Intel SSD Data Center Family typically has about one-third of the average latency and 1,300 times the performance of HDDs.<sup>3</sup> In particular, the Intel SSD DC S3700 Series and Intel SSD DC P3700 Series offer full end-to-end data protection, consistent performance with low latencies, AES 256-bit encryption for enhanced data protection, high write endurance, and high capacities for growing storage needs.

VMware designed Virtual SAN to harness SSD capabilities for high performance read caching and write buffering. By clustering server direct-attached storage with Intel SSDs, Virtual SAN creates a distributed, shared data store at the hypervisor layer that is designed and optimized for virtual machines. As the needs of virtualized applications change, the

hypervisor is uniquely positioned to make I/O optimizations and intelligent data-placement decisions to optimize application performance.

### **Intel® Ethernet Converged Network Adapters**

Based on Intel's unified networking vision for supporting all LAN data and storage traffic on a common Ethernet infrastructure, the 10 gigabit Intel® Ethernet Converged Network Adapter X520 product family can dramatically lower latency and increase the data center's performance versus traditional storage architectures. Intel® X520 adapters provide twice the server bandwidth, which can reduce the necessary energy to power each rack up to 45 percent. Intel® X520 adapters provide the scalable, high-throughput features necessary to meet the demands of combined compute and storage workloads on Virtual SAN systems while reducing infrastructure costs by 15 percent.<sup>4</sup>

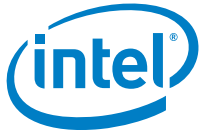
## **Intel and VMware Deliver Better Data Storage Together**

The partnership of Intel technology and VMware Virtual SAN provide a competitive edge through an acceleration of service delivery using an agile software-based storage solution. With Virtual SAN running on the Intel Xeon processor E5 v2 family, the Intel SSD Data Center Family, and 10 Gigabit Intel Ethernet Converged Network Adapters, enterprises can efficiently manage vast, ever-expanding data stores. While enterprise gains the loyalty of their customers through the fulfillment of mission-critical SLAs, greater data center flexibility, and scalability, Intel and VMware maintain the trust of enterprise by helping reduce initial investment costs and total cost of ownership.

## Additional Resources

Intel: [www.intel.com/storage](http://www.intel.com/storage)

VMware: [www.vmware.com/products/virtual-san](http://www.vmware.com/products/virtual-san)



<sup>1</sup> IDC. The Digital Universe of Opportunities: Rich Data and the Increasing Value of the Internet of Things. April 2014. <http://www.emc.com/leadership/digital-universe/2014iview/executive-summary.htm>.

<sup>2</sup> Intel® Virtualization Technology requires a computer system with an enabled Intel® processor, BIOS, and virtual machine monitor (VMM). Functionality, performance, or other benefits will vary depending on hardware and software configurations. Software applications may not be compatible with all operating systems. Consult your PC manufacturer. For more information, visit <http://www.intel.com/go/virtualization.com>.

<sup>3</sup> Intel® Solid State Drive technology with VMware Virtual SAN delivers 2x the IOP's at 1/3rd the latency of hard disk drives. Source: "Unleashing the power of VMware's Virtual SAN on the latest industry standard high performance NVMe/PCIe SSDs", VMworld Aug 2014

<sup>4</sup> Source: Max. I/O R/W bandwidth comparing Intel® Xeon® E5-2680 vs. Intel® Xeon® X5670 and 10 x 1GbE ports to 2 x 10GbE ports

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