Virtual SAN All Flash Storage for VDI

How is VMware Virtual SAN All Flash Storage Used in the Enterprise?
VSAN All Flash Storage allows users to:
1. Accelerate virtual desktop deployments
2. Increase desktop performance and response times
3. Reduce costs of deployment and management

What is Virtual SAN All Flash Storage?
This all flash Virtual SAN Ready Node solution features new 12Gb/s SAS RAID controllers, SanDisk 12Gb/s SAS SSDs, and Dell's PowerEdge 13G family, which improves performance up to 50% over other platforms. This combination of hardware delivers a powerful, scalable storage solution for VSAN environments.

Network connectivity is provided by Arista 7280SE switches, the industry's first 100GbE Top of Rack switch. Built for storage networks, the 7280SE series provides a combination of deep buffers, up to 72 10GbE ports and an extensive list of features.

VMware Virtual SAN software provides the software-defined storage tier for VMware vSphere environments. VMware Virtual SAN is a hypervisor converged storage solution that creates a flash optimized, highly resilient shared datastore. It optimizes the I/O data path to maximize throughput and minimize latency. Also, because it is embedded within the VMware ESXi kernel, Virtual SAN lowers costs and offers superior performance when compared to traditional SANs or external devices.

This solution is built using SanDisk Lightning Gen II 12Gb/s SSDs, which provide sustained performance over a wide range of write intensive, read intensive, and mixed-use applications. With proven endurance and superior reliability, these are ideal for demanding VDI environments.

Key Features
Performance
- 4-node All Flash configuration can support up to 800 VDI desktops, yielding a density of 200 desktops per node
- Fast response time
- Improved disk latency because of 12G end to end all flash integration
- Low network bandwidth utilization
Architecture Details

- VSAN Cluster
  - Four - node All Flash
  - 12 Gb/s SAS End To End
  - Two-Disk Groups in each node
    - 1 Mixed Use SAS + 3 Read Intensive SAS SSD drives

- Desktop VM Details
  - Win 7 – 32 Bit Desktop
  - 1 vCPU, 1 GB RAM
  - 30 GB Disk
  - Linked Clone

Figure 1: 750 VM Result with Office Worker – VSI Index Average

Figure 2: 851 VM Result with Task Worker – VSI Index Average
### Hardware Details

<table>
<thead>
<tr>
<th>Component</th>
<th>Details</th>
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</thead>
<tbody>
<tr>
<td><strong>Server</strong></td>
<td>DELL R730s</td>
</tr>
<tr>
<td></td>
<td>CPU = 2 x Intel Xeon E5-2690 v3 (24 Cores &amp; 48 Threads)</td>
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<tr>
<td></td>
<td>Memory = 384 GB</td>
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<tr>
<td><strong>SSD Drives</strong></td>
<td>12G - SAS drive for caching</td>
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<tr>
<td></td>
<td>(SanDisk Lightning Ascend Gen II – 800 GB)</td>
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<tr>
<td></td>
<td>12G - SAS drive for data</td>
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<tr>
<td></td>
<td>(SanDisk Lightning Eco Gen II – 800 GB)</td>
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<tr>
<td><strong>Disk Controller</strong></td>
<td>Avago 3108 (PERC H730P Mini Controller)</td>
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<tr>
<td><strong>Ethernet Switch</strong></td>
<td>2 Arista DCS-7280SE-72-R 10G switches (Used in Pre-GA vSphere 2015 Test Results)</td>
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In the testing, VSAN Observer was used to determine the overall performance of the reference architecture under heavy VDI load. Unsurprisingly, both disk throughput and IOPS increased as the VDI load increased, but the overall solution was able to handle the load and deliver significant performance gains over other architectures. With an average latency of 1ms, IOPS reached a peak threshold of 1.8k. The maximum throughput was about 100KB/s. There was no memory congestion throughout these tests.

The VSAN all flash reference architecture is able to deliver significantly higher performance for virtual desktop deployments than legacy disk based solutions. This solution is able to support not only a significantly higher number of virtual desktops, but each individual desktop is able to operate with higher performance to deliver a superior user experience.

3  Source: VMware