All Flash Virtual SAN Ready Node
For Fast Virtual Desktops at a Lower Cost

Boost User Experience While Doubling Number of Desktops

- 200 Horizon virtual desktops per node
- 800 Desktops on 4 nodes with ability to scale to 64 Virtual SAN nodes
- Rapid startup of all 800 desktops (3 seconds/ desktop)
- 1 ms average disk latency

Optimize Return on Investment

- Reduces storage costs significantly
- Boosts service levels with faster provisioning of virtual desktops and shared storage
- Increase productivity by reusing vSphere management and storage services

Industry Leading Components used for All-Flash Virtual SAN

- Dell's PowerEdge 13G Servers, Intel Xeon E5-2690 v3 (24 Cores & 48 Threads), 384 GB
- Avago 3108 (PERC H730P Mini Controller)
- SanDisk Lightning Gen II 12Gb/s Mixed Use and Read Intensive SSDs
- Arista 7280SE switches supporting up to 72 10GbE ports

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
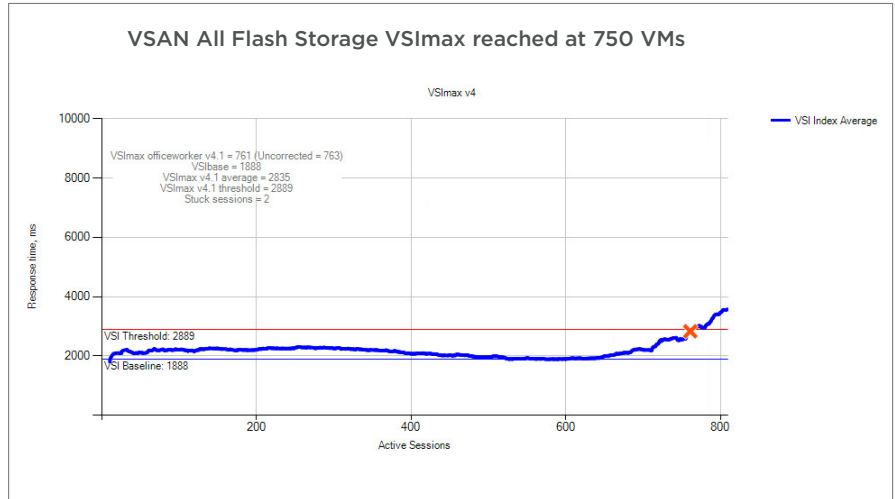- Low network bandwidth utilization

vmware®

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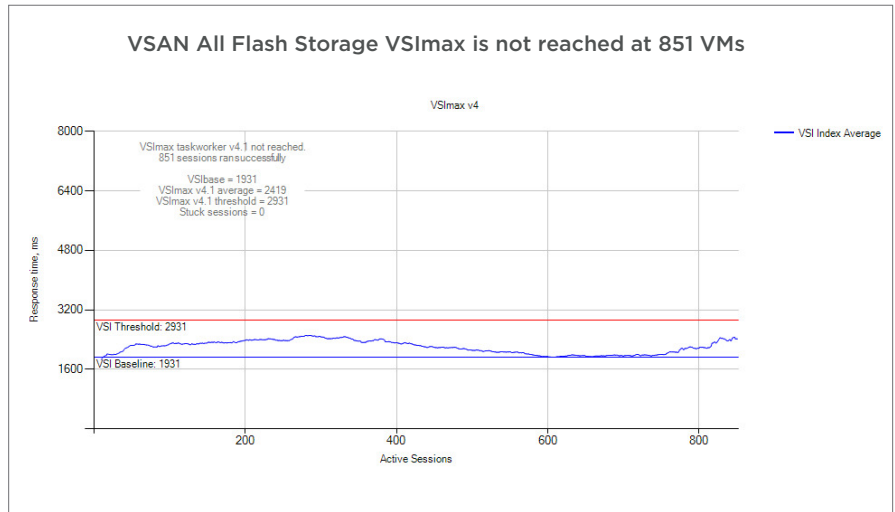

Figure 2: 851 VM Result with Task Worker – VSI Index Average

Architecture Details

- VSAN Cluster
  - o Four – node All Flash
  - o 12 Gb/s SAS End To End
  - o Two-Disk Groups in each node
    - 1 Mixed Use SAS + 3 Read Intensive SAS SSD drives
- Desktop VM Details
  - o Win 7 – 32 Bit Desktop
  - o 1 vCPU, 1 GB RAM
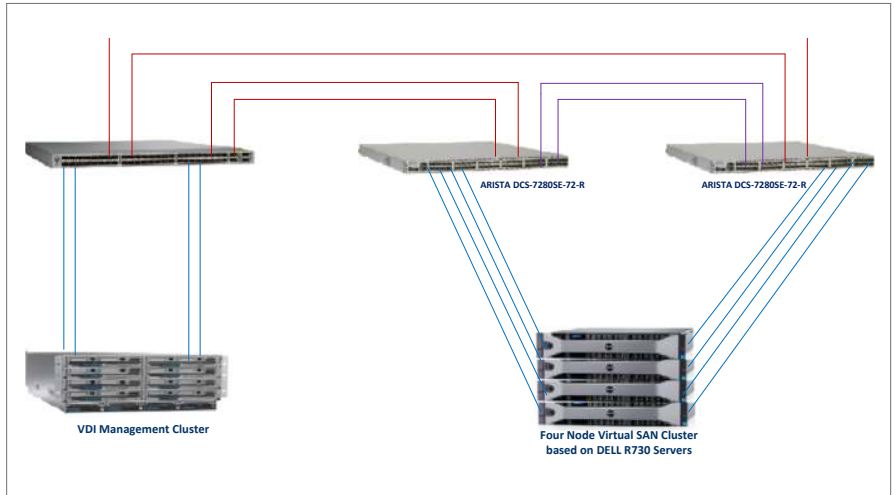 - o 30 GB Disk
  - o Linked Clone

Figure 3: VSAN Reference Architecture

Hardware Details	
Server	**DELL** R730s CPU = 2 x Intel Xeon E5-2690 v3 (24 Cores & 48 Threads) Memory = 384 GB
SSD Drives	12G - SAS drive for caching (**SanDisk** Lightning Ascend Gen II – 800 GB) 12G - SAS drive for data (**SanDisk** Lightning Eco Gen II – 800 GB)
Disk Controller	**Avago** 3108 (PERC H730P Mini Controller)
Ethernet Switch	2 **Arista** DCS-7280SE-72-R 10G switches (Used in Pre-GA vSphere 2015 Test Results)

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 18k. 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.

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1 IDC, U.S. and Worldwide Server Installed Base 2007–2011 Forecast, Doc #207044, May 2007;

2 IDC, Virtualization and Multicore Innovations Disrupt The Worldwide Server Market, Doc #206035, March 2007;

3 Source: VMware