

Simplifying Storage Scalability with VMware Virtual SAN on System x Servers

The power of VMware Virtual SAN on System x3550, x3650, and Flex System x240 servers

Executive Overview

Today, data is being created by human and automated systems at an unprecedented rate. In addition, there are regulations and requirements that result in increased data retention. As a result, storage demands are exploding, as shown in *Figure 1*.¹

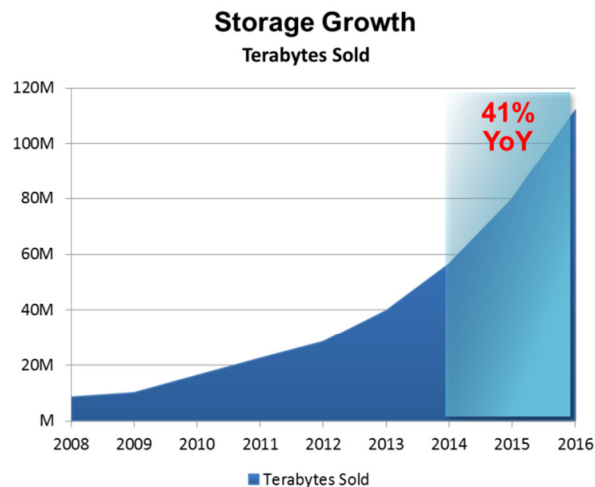


Figure 1. Explosive growth in storage puts pressure on the data center

In addition, in order to meet the most pressing storage challenges, future expectations for storage are also increasing dramatically, as shown in Figure 2.

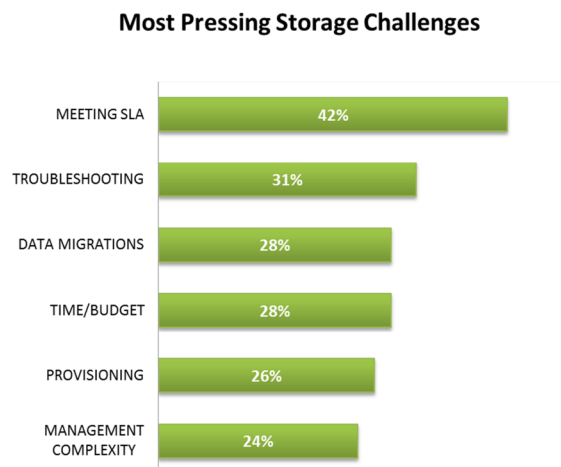


Figure 2. Managing and provisioning storage are two of the top storage challenges

¹ Source: IDC, Yezhkova, Worldwide Enterprise Storage Systems Forecast, November 2013, #244293; <http://www.idc.com/getdoc.jsp?containerId=WC20140109> (by subscription).

These requirements and expectations demand the improvements and simplifications that a virtualized storage system can offer.² As a result, efficiency has progressed from being important to being imperative, not only in the implementation of new technologies but also in their selection. An example of this is in the area of software-defined storage (SDS). Centralized storage in a storage-area network (SAN) or network-attached storage (NAS) has proven to be an excellent example of storage efficiency. With the potential for further improvement, companies are evaluating and moving to SDS. Storage efficiency comes from these key areas:

- Scalability
- Price/Performance
- Reliability

The best example of the improvements in storage efficiency is demonstrated through the combination of System x[®] and Flex System[™] servers (collectively, “System x”) from Lenovo with VMware Virtual SAN[™] storage. In fact, System x-based Ready Nodes have now become ready-to-go SDS building blocks for IT datacenters, as shown below.

This paper describes the power of Virtual SAN on Lenovo’s System x3550 and x3650 (M4 and M5) rack servers and the Flex System x240 and x240 M5 blade servers. It details the unique benefits of the System x Ready Nodes with the Virtual SAN solution architecture and how it can be used to quickly deploy a System x server-based Virtual SAN Ready Node configuration.

The intended audience of this white paper includes distributors (Technical and Marketing); business partners; end clients, such as IT and line of business (LOB); and internal Sales and Marketing teams and field representatives. It is written for those who have experience with basic configuration requirements for System x servers and a basic understanding of VMware Virtual SAN storage server and the benefit to be derived from it.

VMware Virtual SAN

VMware Virtual SAN is a software-defined storage tier for VMware vSphere[®] environments. Virtual SAN clusters the server HDDs and SSDs to create radically simple, high-performance, resilient, shared storage designed for virtual machines. Some of the benefits of Virtual SAN include:

- **Lower TCO** — Reduce TCO up to **50 percent** by leveraging server-side HDDs and SSDs to create a converged and resilient “SAN-like” storage tier within the hypervisor.
- **Lower CapEx** — Server-side enterprise storage economics lowers capital expenses.
- **Lower OpEx** — Automation and more efficient management lowers operating expenses. vSphere integration ensures that current skillsets can be used to manage the technology. In other words, “If you know vSphere, you know Virtual SAN.”
- **Predictability** — No large up-front investments. Virtual SAN allows you to scale granularly, and avoid overprovisioning and overpaying for future capacity and performance needs.

Virtual SAN is simple and automates time-consuming manual storage tasks. Not only is Virtual SAN managed through vSphere, but it also integrates with other VMware[®] products. This integration makes the provisioning and management of storage in virtual environments simple.

When combined with System x, Virtual SAN provides a robust hyper-converged storage solution. Hyper-converged storage is a solution that combines storage, computing, networking, and virtualization into a single unit. It has been receiving strong acceptance in the market, because it provides IT with greater control over storage management in a virtual environment and there is minimal configuration required. And, in the case of the Lenovo and VMware solution, Virtual SAN is fully integrated with vSphere and can be provisioned rapidly and managed easily from VMware vCenter[™], leveraging the existing experience and knowledge within datacenters using VMware for virtualization.

The concept of hyperconvergence was derived from converged infrastructure technology, such as the IBM[®] PureFlex[®] System, which includes storage, computing, and networking in one box. These “infrastructure in a box” solutions have resonated with small and medium-sized businesses (SMBs). According to a recent Gartner report, midmarket IT organizations are frustrated with the complexity and high cost of existing storage systems³, and are highly receptive to VMware’s Virtual SAN “best of breed” offering.

System x Virtual SAN Configurations

A world-class solution requires more than just leading-edge software. It also requires top-notch hardware, service (and services), and technical support. As the hardware foundation for this solution, System x3550 and x3650 rack-optimized

² Source: IDC, Storage Predictions 2014, January 2014, General Storage QuickPoll, #243511, n=307.

³ <http://www.gartner.com/technology/reprints.do?id=1-24S6MX4&ct=141113&st=sb>.

servers from Lenovo, as well as Flex System x240 blade servers, offer a combination of advantages that other platforms lack, creating the premiere Virtual SAN solution:

- System x servers (collectively, including Flex System servers) are **#1 in x86 reliability**, according to the latest ITIC survey⁴
- System x servers (collectively, including Flex System servers) are **#1 in customer satisfaction** overall for the 12th consecutive quarter (including **#1** in Product Satisfaction, **#1** in Service Satisfaction, and **#1** in Sales Responsiveness), according to the latest TBR survey.⁵
- The x3550 M5, x3650 M5, and x240 M5 offer the **most memory capacity** in their respective classes (**1.5TB**).

Lenovo has defined six ready-to-go configurations as part of the VMware Ready Node definition. There are three base configurations for use with a wide range of workloads and three that are optimized for Virtual Desktop implementations, as shown in *Table 1* and *Table 2*.

Solution Reference Number	Server Type	Description
BSIVSN34L00	System x3550 M4	Designed for optimal affordability
BSIVSN34M00	System x3650 M4	Mainstream for most workloads
BSIVSN34H00	System x3650 M4	Maximizes virtual machine density
BSIVDI34LC0	System x3650 M4	VDI Linked Clones for seat density
BSIVDI34LC1	System x3650 M4	VDI Linked Clones for growth
BSIVDI34FC0	System x3650 M4	VDI Full Clones for performance

Table 1. *System x 3550 M4 and x3650 M4 Virtual SAN Ready Nodes*

Solution Reference Number	Server Type	Description
VINSDSXL051	x240 + SEN	Designed for optimal affordability
VINSDSXM051	x240 + SEN	Mainstream for most workloads
VINSDSXH051	x240 + SEN	Maximizes virtual machine density
VDISDSXL051	x240 + SEN	VDI Linked Clones for seat density
VDISDSXF051	x240 + SEN	VDI Full Clones for performance

Table 2. *Flex System x240 and Storage Expansion Node-based Flex System Virtual SAN Ready Nodes*

Note: System x M5 and Flex System M5-based solutions will be available shortly, with improvements in performance, memory capacity, and availability. Contact your Lenovo representative or business partner for SRNs when available.

Next, let us look specifically at the systems management, compute, network, and storage subsystems.

x3650 Key Features

The x3650 M4 and x3650 M5 servers are very similar in appearance. Key components of the x3650 M5 server are shown in *Figure 3*, *Figure 4*, and *Figure 5* for illustration.

⁴ ITIC 2014-2015 Reliability Survey, May 2014; <http://public.dhe.ibm.com/common/ssi/ecm/en/xsl03126usen/XSL03126USEN.PDF>

⁵ TBR Customer Satisfaction Survey, August 2014; <http://public.dhe.ibm.com/common/ssi/ecm/en/xsw03117usen/XSW03117USEN.PDF>

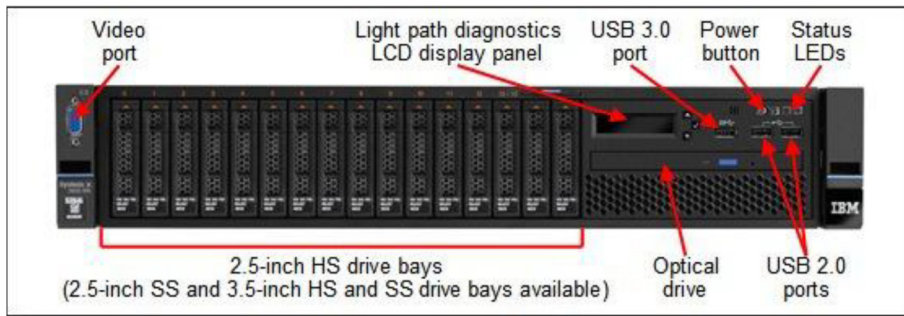


Figure 3. Front view of the System x3650 M5

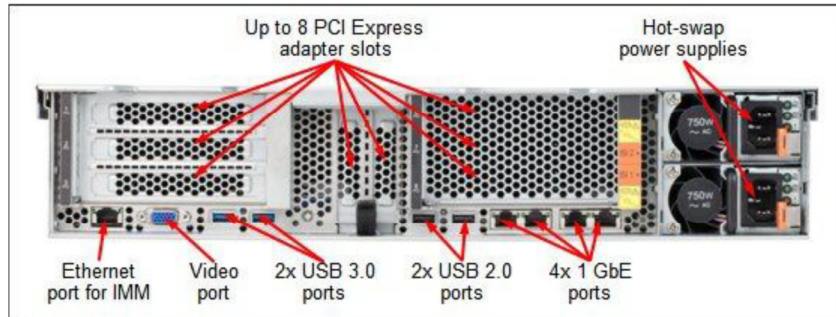


Figure 4. Rear view of the System x3650 M5

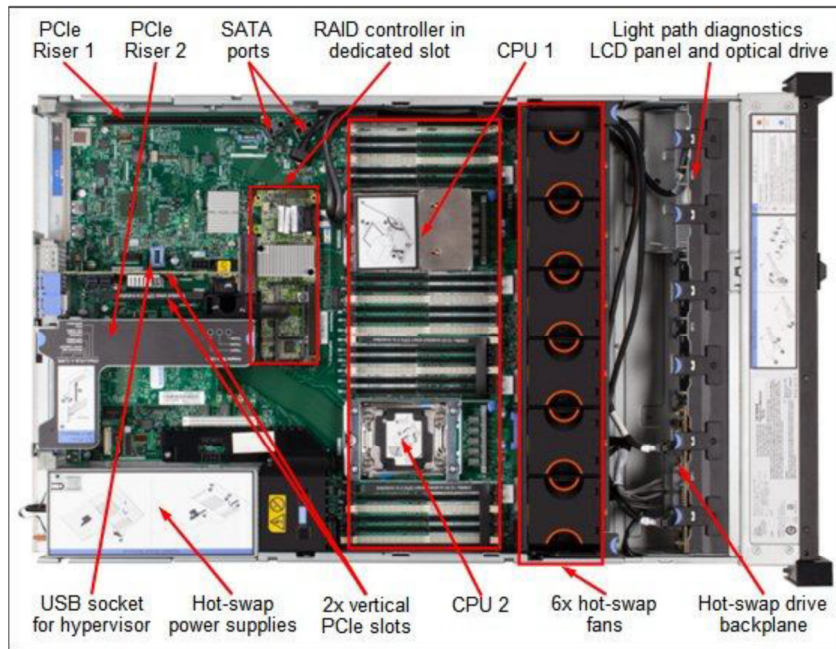


Figure 5. Inside view of the System x3650 M5

Note that the internal USB socket for the VMware hypervisor is part of the configuration. The server supports VMware vSphere ESXi installed on the USB flash drive, which is installed in the internal USB socket, as shown in *Figure 5*. Supported versions of VMware vSphere include:

- VMware vSphere 5.5 (ESXi)
- VMware vSphere 5.1 (ESXi) with Update 2

Figure 6 demonstrates the storage flexibility inherent in the System x3650 M5, which offers six different internal storage configurations:



Figure 6. Internal x3650 M5 drive configurations

x240 Compute Node Key and Storage Expansion Node Key Features

The Flex System x240 (M4) and x240 M5 servers are very similar in appearance. Key components of the x240 M5 server are shown in *Figure 7* and *Figure 8* for illustration. x240 and x240 M5 Compute Nodes (*Figure 7*) are high-availability, scalable blades optimized to support the latest generations of Intel® microprocessor technology and are ideally suited for medium and large businesses.

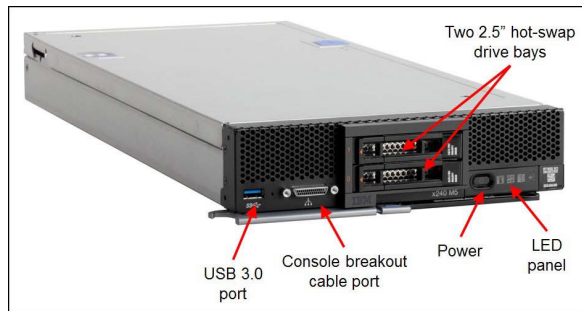


Figure 7. Front view of the Flex System x240 M5 Compute Node

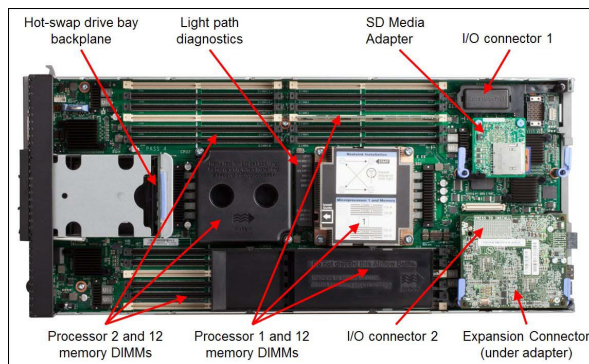


Figure 8. Inside view of the x240 Compute Node

Figure 9 shows the Flex System Storage Expansion Node (SEN), which adds 12 drive bays to the attached compute node. All bays in the expansion node are hot-swappable. The drive bays slide out on an internal rail system. When a suitable RAID level is employed, a failed drive can be removed while the system is still running. With HDD storage capacity of up to 14.4TB, the Storage Expansion Node is ideal for applications that can use large amounts of additional local storage.



Figure 9. Flex System Storage Expansion Node (right) attached to an x240 Compute Node (left)

Summary

VMware Virtual SAN is gaining momentum and mindshare because of its ability to simplify and automate time-consuming manual storage tasks. Virtual SAN delivers unmatched price/performance and simplicity compared to other virtual storage offerings or midrange hybrid arrays available today. These storage solutions are now available across the Lenovo portfolio of rack and blade servers to fit many client needs. The combination of Virtual SAN on System x servers from Lenovo creates an unbeatable solution, offering.

- Lower TCO
- Lower CapEx
- Lower OpEx
- Predictability
- #1 reliability
- #1 customer satisfaction

These configurations are available through Lenovo Certified Business Partners. To order the System x Ready Nodes described above, contact your Lenovo Sales Representative or business partner. To purchase, or to obtain more information about these System x solutions, contact your Lenovo Business Partner, or visit www.ibm.com/systems/x/os/vmware. Refer to the Solution Reference Number listed in Tables 1 and 2 and at the Lenovo business partner-accessible link (for registered partners) on **LETS**.

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