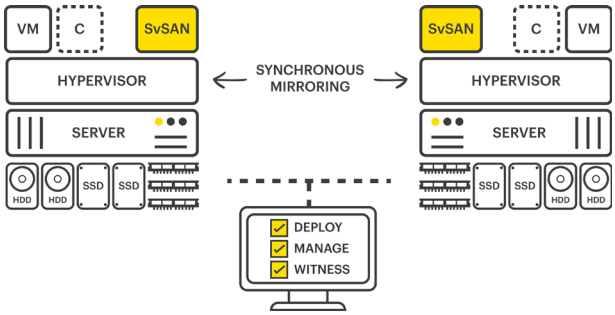
binary testing

The UK's premier independent network testing laboratory

StorMagic SvSAN 6.3

A lab test and evaluation of StorMagic's highly available two-node virtual SAN

StorMagic SvSAN



Key findings

- Ideal for edge deployments
- Rock solid fault tolerance
- Affordable 2-node cluster solution
- Runs on VMware, Hyper-V or Linux KVM hosts
- Supports any x86 server-grade system
- Modest hardware requirements for VSAs
- Can be deployed in as little as one hour
- Smart witness service
- Extensive management and monitoring features
- Edge Control ideal for remote management of distributed clusters

The benefits of software defined storage

Businesses that cannot tolerate any storage downtime for their business-critical applications are finding software-defined storage (SDS) is the way forward. There are many SDS solutions on today's market and a fundamental feature is their ability to decouple the storage hardware from the software that manages it.

Not all lend themselves well to SMBs, distributed environments and edge applications though, as some can be too expensive and difficult to manage. StorMagic stands out from the crowd as its highly affordable SvSAN solution is ideal for these environments as it pushes storage resiliency to the network edge but without the high costs and complexity associated with many competing products.

SvSAN creates high availability IP SANs using VMware, Hyper-V or Linux KVM hosts. Deployed as virtual storage appliances (VSAs), it supports internal and external direct-attached storage HDDs and SSDs and doesn't lock you into proprietary hardware as you can use any industry standard x86 servers.

Another bonus of SvSAN is its extremely modest system requirements as you can create a highly available storage cluster using only two servers where it implements synchronous mirroring between them. SMBs and those with small edge deployments will approve further as SvSAN requires a minimum of one virtual CPU (vCPU) and 1GB of memory.

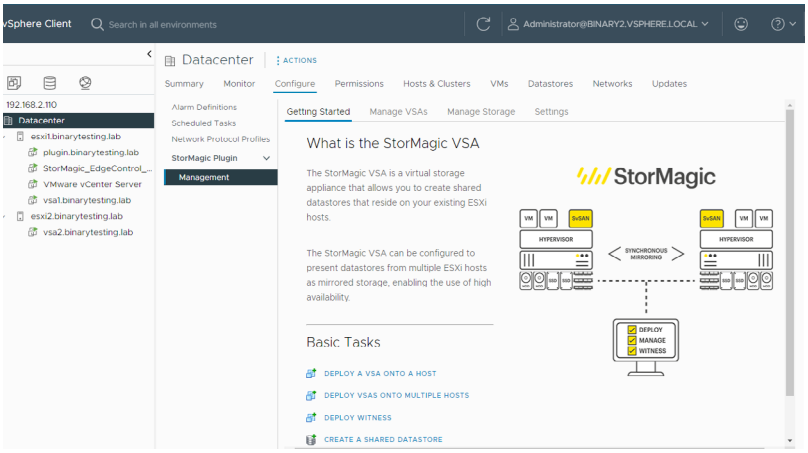
Other SDS products often require at least three server nodes to provide full data integrity in the event of a mirror failure. StorMagic has a more elegant solution as its SvSAN witness runs on a separate system and acts as a quorum service which can be shared between up to 1,000 clusters.

It creates a logical triangle between itself and the VSAs and ensures that if a host goes down or a WAN link fails, the remaining storage nodes will continue to function. It can exist unobtrusively on any Windows or Linux host or in its own VM or container and neatly avoids the dreaded mirror 'split-brain' syndrome where mirrored cluster nodes all become isolated and start operating independently.

The witness is a passive partner as it doesn't service any data I/O requests, can be deployed locally or remotely and is so small you can even run it on a Raspberry Pi. There's more, as the witness can be hosted on any NAS appliance that provides a virtual machine manager application and StorMagic also offers a WaaS (Witness as a Service) option for cloud deployments.

SvSAN deployment

For our two server SvSAN cluster, we used Dell Gen16 PowerEdge and HPE ProLiant Gen10 dual-socket Xeon Scalable rack servers. It should be noted that the specification of these servers was well above StorMagic's system requirements and the test was conducted in this manner to show how easy it is to use disparate hardware for each SvSAN node.



StorMagic's VMware plug-in makes light work of VSA, shared storage and witness configuration

Each server was installed with VMware ESXi 8 with the Dell server also hosting VMware vCentre Server. Before installing SvSAN, there are some prerequisites as you should decide what network ports you want to use with all iSCSI traffic placed on a dedicated virtual switch with VMware's iSCSI service enabled.

The easiest way to install the SvSAN nodes is to use StorMagic's plug-in VM and we loaded this on the system hosting vCenter using the supplied OVA file. It only takes a few minutes to install and adds a new configuration option at the vSphere Client datacentre level specifically for SvSAN.

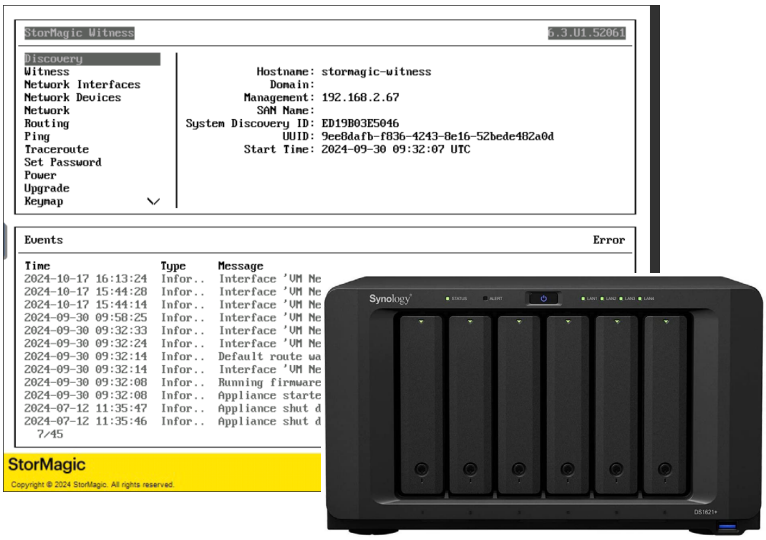
The plug-in makes light work of VSA deployment with options for pushing them to single or multiple ESXi hosts. In both cases, a wizard guided us through the process where we chose our ESXi hosts, provided names for the VSAs plus our domain and defined a datastore which would be reallocated to the VSAs as shared storage.

We could optionally enable SSD caching by selecting available devices using RDM (raw device mapping) along with memory caching using the specified reserved amount. We then selected two network interfaces for the VSA with the mandatory static IP addressing applied for those supporting mirroring and iSCSI traffic, applied a licence and VSA password, checked the summary page and left the plug-in to deploy the VSAs.

The plug-in deftly handles mirrored datastore creation where you choose both VSAs, optionally enable spanned storage and encrypt it if you have an existing KMS (key management server) available. You can also use the plug-in to deploy a witness to a managed ESXi system which must not be on the same physical machines as the SvSAN cluster nodes.

There are plenty of other witness deployment scenarios and a very simple option is to install it on a budget-priced NAS appliance which provides the desired separation from the SvSAN hosts. We tested this with a Synology DS1621+ desktop NAS running DSM 7.2 and the Virtual Machine Manager (VMM) application.

Resource requirements are equally undemanding as the witness only requires one vCPU and 1GB of memory. Installation was simple as we uploaded the witness VMDK file to the appliance and used the VMM import function to create a new VM. Bringing the witness into play is a cinch as after checking from their web GUIs that the VSAs had automatically discovered it, we applied it to both of them.

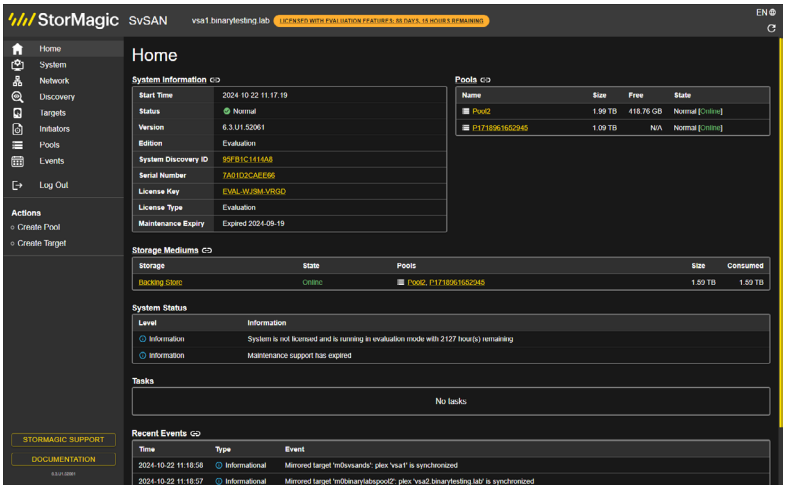


We had no problems deploying the SvSAN witness to a Synology NAS appliance

Management

The VMware SvSAN plug-in provides basic management access to the VSAs and shared datastores along with options to grow, migrate, mount, extend or destroy storage pools. The plug-in includes a link to each VSA's web GUI which provides access to every SvSAN feature with its left pane presenting a tidy tree menu.

It's well designed and very easy to navigate as when an option is selected in the main menu, the list below changes to present only those relevant actions. You can view overall VSA status and events, see system information and run firmware upgrades, monitor performance statistics graphs and configure targets, initiators and pools.



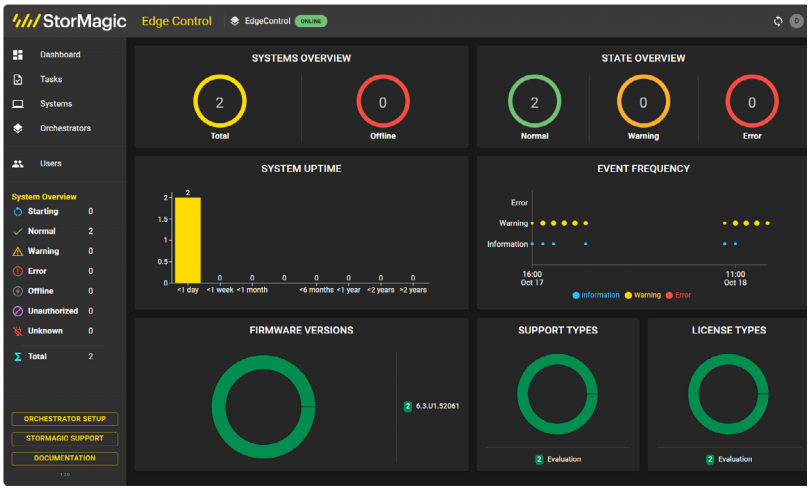
Each VSA offers its own web GUI which provides full access to all SvSAN features

It's worth adding initiators first as once logged in, they appear in the web GUI ready for assignment – for these tests, we used two more Xeon Scalable rack servers running Windows Server 2022. To assign initiators, you select a target, choose those you want from the drop-down menu and apply the changes.

When creating pools from the plug-in, you can switch over to the web GUI to review their status. When we defined a 512GB shared storage pool, a new iSCSI target was automatically created for it with the initial synchronization taking 54 minutes and the web GUI providing real time status updates on its progress.

StorMagic Edge Control

Businesses with multiple remote deployments will approve of StorMagic's Edge Control as this cloud-hosted service provides centralized management and monitoring of all their SvSAN clusters from a single pane of glass. The Edge Control Orchestrator can be deployed on VMware, Hyper-V or Linux KVM hosts and system requirements for small environments are minimal as the VM only requires one vCPU, 4GB of memory and 8GB of disk space.



StorMagic's Edge Control cloud portal provides a complete status overview of all VSA clusters

We had no problems deploying the Orchestrator to one of our ESXi 8 hypervisor hosts and after setting up secure login credentials and 2FA for our cloud account, we could view our SvSAN estate from its informative dashboard. This shows system and state overviews along with uptime, event frequency, VSA firmware versions and licence status.

The Systems menu showed all our VSAs and selecting one provided more details in a side menu such as networks, hypervisors and datastores. Click on the Configuration tab and you can run tasks such as applying new licences, remotely upgrading VSA firmware or rebooting them and the portal provides direct links to each VSA's web GUI.

High availability testing

To test SvSAN's high availability, we created a dual Gigabit iSCSI MPIO link on a test Windows Server host to one of the SvSAN targets and ran the open-source Iometer performance utility. With both cluster nodes available, Iometer reported raw sequential read rates of 226MB/sec – numbers we'd expect to see from this type of connection.

We then conducted a range of tests to simulate a VSA failure which included removing the network cable for the iSCSI backend service on one of the VSA hosts, powering down a VSA and closing the entire VSA host server down. In all cases, we received alerts on detected errors and watched Iometer continue unabated, albeit at half speed.

When the downed VSA was returned to active duty, we monitored its progress from the web GUI of the active VSA. Recovery times are fast as when we powered the VSA back on, we watched it boot up and automatically resynchronize the mirror with the entire process taking only 61 seconds. We also saw on our test host that Iometer returned to full speed as soon as the second VSA was back online.

This speedy recovery process makes VSA host maintenance a breeze as we wanted to add new physical storage devices to one of the VSAs which required it to be shut down first. From vCenter, we added the new devices, powered the VSA VM back on and saw the mirror resynchronized in the same amount of time as our previous tests.

We also created a scenario where one VSA became completely isolated from the cluster and the witness. In this situation, the witness marked the VSA as down and its mirror plexes were taken offline to avoid a split-brain condition. Once again, when the VSA was restored to active duty, we saw the same fast resynchronization process with our test server never losing contact with its iSCSI target during the entire process.

During our high availability tests, the Edge Control portal and VSA web GUI provided plenty of alerts when systems went offline

Conclusion

StorMagic's SvSAN is ideal for SMBs and larger businesses with numerous edge deployments that need a highly available storage solution for business-critical environments. StorMagic's simplified licensing schemes make it very affordable as these are based on the amount of storage plus number of cluster nodes required and are available as perpetual or subscription licences.

During testing, Binary Testing found SvSAN easy to install and can verify that once the underlying infrastructure is ready to receive it, a two server node SvSAN cluster can be deployed in around an hour. We had no problems using VMware ESXi 8 hosts and liked the SvSAN plugin as it proved to be a valuable management and configuration resource.

Other factors that add extra versatility are SvSAN's support for virtually any x86 host system and storage device along with very modest hardware requirements. It's quite feasible to run SvSAN on low-cost, entry-level servers and is ideal for smaller businesses that may want to repurpose older systems.

We were also impressed with the SvSAN witness as this neatly avoids the need to acquire a third server to provide high availability services. The fact that we were able to deploy it on a low cost Synology NAS appliance which didn't even need to be dedicated to this task makes it even more cost-effective.

Binary Testing conducted a number of failover scenarios and SvSAN took them all its stride with our test servers never losing contact with their virtual storage. We also verified that closing down one VSA to perform upgrades and maintenance had no impact on storage availability.

Management features are extensive with the SvSAN plug-in providing all the tools we needed to create and manage VSAs and shared storage. IP SAN target and initiator configuration is easily achieved from the VSA web GUI which also provides quick access to all network settings, clear information about mirror synchronization status and plenty of graphical performance stats.

Businesses with distributed edge deployments will find StorMagic's Edge Control cloud-hosted service well worth considering. It's another SvSAN component that's simple to deploy and capable of providing valuable information about geographically distributed SvSAN clusters.

The demand for edge computing is growing rapidly as businesses find it makes more sense to process data where it is being generated instead of pushing it all back to the data centre. Binary Testing specialises in conducting hands-on lab reviews of edge compute systems and has seen a steady increase in the range of ruggedized systems specifically designed for harsh environments out at the far reaches of the network.

StorMagic is well positioned to take advantage of this demand as its SvSAN solution is perfectly suited for use on edge servers. It's an elegant and highly cost-effective product that's a great choice for SMBs and particularly for edge applications that need highly available storage in places where failure is not an option.