

Product review: Syneto Storage OS, ZFS power and ease of use combined

Prepared for: Syneto
June 2014

TABLE OF CONTENTS

TABLE OF CONTENTS	1
EXECUTIVE SUMMARY	2
WHY SYNETO AND ZFS	3
Who is Syneto?	3
What is ZFS?	3
Syneto and the open source community	4
Syneto Storage OS	4
Why it is important for you	4
MORE THAN UNIFIED STORAGE	5
Agility and flexibility of a multi protocol storage	5
Syneto OS protocols and features	5
Why it is important for you	6
EASE OF USE AND INTERACTIVE SUPPORT	7
A storage for everyone	7
Direct help from engineers	7
Why it is important for you	8
AVAILABILITY, RESILIENCY AND MORE	9
High Availability	9
Advanced snapshots and remote replica	9
Why it is important for you	10
INTEGRATION WITH VMWARE	11
Snapshots and clones with VMware	11
Why it is important for you	12
ONE OS, MANY POSSIBILITIES	13
Licensing model	13
Hardware appliances	13
Why it is important for you	13
BOTTOM LINE	14
JUKU	15
Why Juku	15
Author	15

EXECUTIVE SUMMARY

Demand for storage capacity is growing at an almost unsustainable pace, last estimates talk about 50% Year/Year, as for its performance.

Cost and performance of traditional solutions, both in terms of TCA and TCO, is no longer compatible with today's business needs and they are not designed to properly leverage new technologies like SSD. On the other hand, All Flash Arrays are still too expensive to be considered as a viable solution for all types of data: \$/GB ratio remains too high.

Fortunately, looking at data access patterns for most organizations, it's easy to see that the percentage of active data is relatively small (it's usually around 10/15% of the total) while the most of it is less, or probably never, accessed. Next generation hybrid storage systems bring the advantages of both worlds: Flash, where hottest data reside, coupled with Hard Disk Drives, which allow storing colder data at a much lower cost. At the moment, this is the best compromise between \$/GB and \$/IOPS.

Cutting-edge software features are another fundamental key to optimize storage and to drive costs down. Maximizing space efficiency through data footprint reduction techniques, modern data protection mechanisms, smart snapshots/replica functionalities, ease of use, as well as integration with major Hypervisors and Operating Systems are all must-have characteristics of any modern storage system. And even more, in an era where we talk about software-defined, software and hardware file cycles should be split one from the other.

Syneto, thanks to its open source soul and adoption of ZFS, provides a complete product line of fully-configurable physical hybrid appliances and software solutions, based on Syneto Storage OS. The perpetual software licensing model enables customers to preserve their investments by maintaining their infrastructures up to date with the latest innovations on any supported hardware. Ease of use and high availability features make this solution very well suited for tier 1 storage in SMB enterprises and tier 2 applications in larger ones.

WHY SYNETO AND ZFS

Who is Syneto?

Syneto is a young European storage vendor with offices in Italy and Romania, and with customers spread in all major European countries. The company started the development of Syneto Storage OS, a scalable ZFS-based storage and virtualization solution, in 2008. Strong open source belief, ability of listening to end users needs and an agile-minded software development team are leading the growth of the product. Syneto storage solutions are currently available through resellers and OEM partners.



What is ZFS?

Zettabyte File System (ZFS) is a next generation File System combined with a volume manager. It was originally developed by Sun Microsystems and released under the Common Development Distribution License (CDDL). Now, OpenZFS (the open source alternative to the commercial version of ZFS) is available as part of Illumos (a fork of OpenSolaris) and it is freely downloadable for FreeBSD, Linux and Mac OS X.

ZFS is an extremely highly scalable File System which includes advanced features like:

- volume management and wide striping,
- layered hierarchical caching;
- strong data integrity,
- compression and deduplication,
- multiple parity RAID data protection schemes,
- snapshots, clones and remote replication,
- Native NFS and SMB support.

These characteristics combined make ZFS the ideal core for reliable, feature-rich, high performance and cost effective storage platforms capable of managing different types of workloads.

Syneto and the open source community

Syneto development team is an active open source community contributor. Examples can be found looking at [VMwarephp](#), a PHP library hosted on [GitHub](#) which contains bindings for vSphere API, or ZFS/Illumos submissions and participation to the [OpenZFS](#) forums.

Syneto Storage OS

Syneto Storage OS is an Illumos-based storage operating system which leverages OpenZFS and other innovative technologies to provide a next generation storage platform.

The ZFS foundation was enriched with:

- an easy to use and intuitive web GUI,
- High Availability features,
- snapshots and remote replication scheduler,
- integration with VMware,
- server virtualization capabilities into the storage controllers,
- an integrated support system with Syneto's Help desk.

At the moment, Storage OS is at version 2.15 and it's sold as a perpetual license. This means that the customer buys the license once and can reuse it on future hardware generations. On the contrary of most hardware storage vendors, this approach grants an important investment protection for the end user who will have to buy software only once. Storage OS is available as a free download for evaluation purposes (free up to 1TB) from Syneto's website.

Why it is important for you

Syneto Storage OS is a valid example of a modern Storage operating system which combines features, availability and ease of use all together. The integration with hardware appliances proposed by Syneto provide an out-of-the-box solution which is aimed at improving the end user experience and quality of support.

MORE THAN UNIFIED STORAGE

Agility and flexibility of a multi protocol storage

A multi protocol storage system, especially in small and medium sized organizations, brings a huge benefit in terms of agility. In fact, SMB enterprises tend to buy a single storage system to serve various needs: ERP, DB, Virtualized infrastructure, files and so on. They do so because of budget restrictions and also because they have few, maybe only one, system administrator.

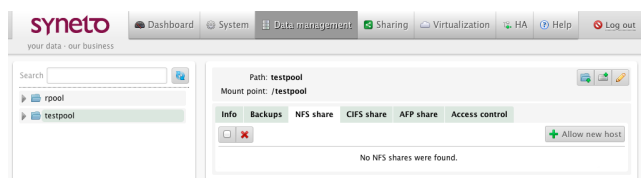
For the same reason mentioned above, these companies want easy to use storage systems with a broad set of features capable of automating most functions, simplifying data protection operations and it should be integrated with the rest of the infrastructure.

A unified storage array usually provides iSCSI and FC for blocks while SMB and NFS cover the file access.

Syneto OS protocols and features

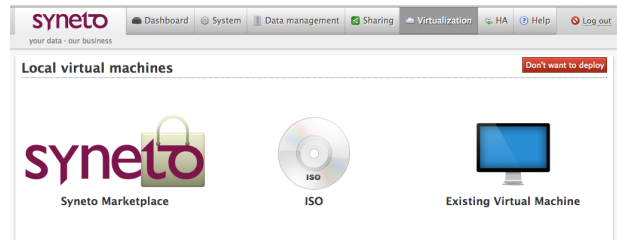
Syneto storage OS provides more than that. Apart from the mentioned protocols (FC, iSCSI, SMB and NFS), AFS (Apple File Protocol) and integration with Active Directory, it is possible to run KVM based VMs inside the storage controllers.

Even though, it cannot be considered a full featured hyper converged infrastructure yet (mobility and high availability of the VMs is not managed at this time but it will be



available in future versions), this is a very handy feature in many different use cases. VMs can be imported, installed from scratch (via ISO images), or downloaded ready-to-use from Syneto Marketplace (a templates repository).

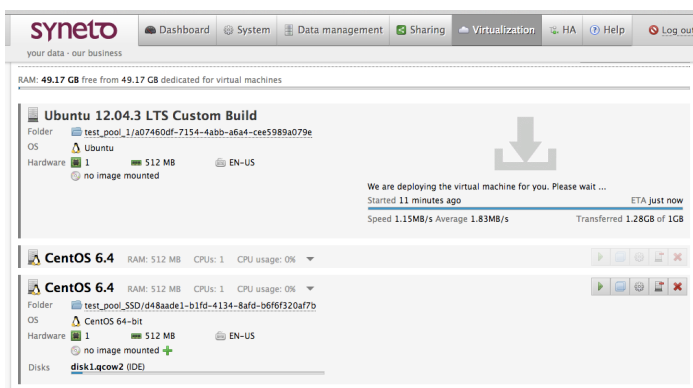
For example, it is possible to create a Backup or a DB/Analytics appliance (VM and data in the same machine). In remote offices installations, it could be very intriguing installing a bunch of VMs to run infrastructure services like AD, DHCP and the like. The list of possible applications is endless and VMs can be remotely backed up and replicated with their data.



Why it is important for you

Syneto is a full featured unified storage solution and local virtualization functionality is the icing on the cake.

Local virtualization capabilities are really interesting and can be very helpful to deploy cost effective solutions where CPU power is needed close to the data. When the high availability feature will be extended to the VMs hosted in the controllers there will be even more possibilities.



The extreme flexibility of Syneto Storage OS allows to build any kind of configuration in terms of protocols and media. 1GbE and 10GbE NICs, as well as 8/16 Gb/s FC ports, are supported in many different combinations. The system usually supports SAS backend but future versions of the product will be

able to virtualize external FC and iSCSI arrays too (which is a great opportunity for the end user to bring new life to old storage).

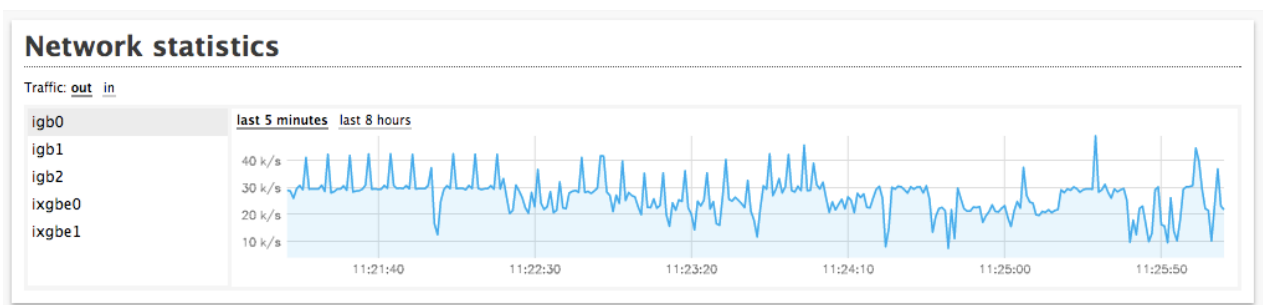
EASE OF USE AND INTERACTIVE SUPPORT

A storage for everyone

Syneto Storage OS has an incredibly easy to use and really intuitive web UI. The appliance comes pre-installed and the configuration process is a simple step-by-step smooth procedure (it practically consists in assigning basic network information to enable the web management interface).

Ease of use comes at a price though and most of ZFS concepts are simplified. This could annoy the experienced storage administrator, but it is not bad if you consider that it can be managed by very low skilled general purpose admins. There is no mention, for example, about the type of RAID used but the UI talks only about the level of parity.

The dashboard, thanks to Dtrace, a technology available on Illumos, shows real time graphs on IOPS and throughput for either the whole system or the single components.



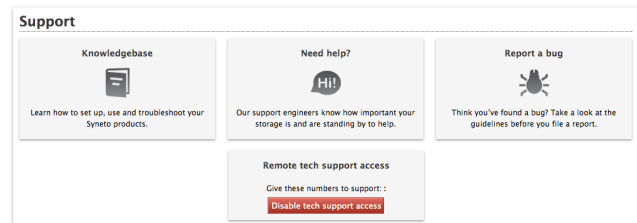
The complete knowledge base, including documents, HOW-TOs, FAQs and release notes is available online. All management procedures are well explained step-by-step and interactive help desk is always available.

Direct help from engineers

Syneto's support is attainable through the web UI. Opening a support ticket is incredibly easy: you fill in your name, email and description of the problem on a web form and the

system collects all the information (like logs and configurations) and sends it to Syneto. Once again, this is particularly helpful for unskilled users and concurs to speed up all the support process.

Syneto offers different support plans which range from basic to premium 7x24 service. Choice of the plan depends on how critical the appliance is and if the customer wants access to advanced services like pro-active monitoring and dedicated contacts.



Besides phone calls, Syneto also offers a chat service via Skype® and a screen sharing capability to directly work with the customer in case of a problem and or specific configuration.

Why it is important for you

Easy to use IT systems allow to save money by drastically cutting down training costs and are easier to deploy and manage. The direct consequence is that Overall TCO is driven down, especially for SMB organizations where skills are harder to find and the IT management teams are usually small.

Good support is another key aspect and it can be considered one of the best features of a company! The storage system could be rock solid but bad things do happen and having access to a good support team is much more comforting for the end user.

Syneto does not have the traditional call center but support tickets and technical chat are directly managed by experienced engineers. This usually means a faster response and shorter time for resolution.

AVAILABILITY, RESILIENCY AND MORE

High Availability

Storage is at the base of IT infrastructures and, in most of the cases, it needs to be always available. Each single service disruption has a direct impact on business operations and should be avoided by all means. ZFS has a lot of features which are designed to improve data integrity and resiliency, but there is no standard HA for ZFS. Fortunately, a ZFS disk pool can be exported and imported by different servers, but this is not an automatic operation. Consequently, each ZFS vendor has developed its HA clustering mechanism and implementations differs in terms of functionality, load balancing between controllers and ease of use.

Syneto, as for all other features, has made it very simple from the end user perspective while the backend has a smart and elegant design. Disk pools can be indifferently distributed on the two cluster nodes and each one of them can serve its own traffic. When a fail occurs the HA mechanism automatically imports volumes from the failed node to the active one. All the configurations are maintained and service restarts seconds later.

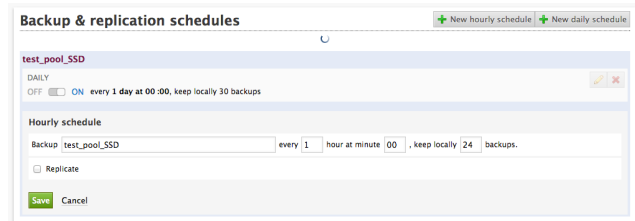
The most important part of this HA implementation, relies on the fact that Syneto worked to minimize the switching time between nodes time by adding a “fast import” for ZFS pools (notoriously slow, especially with a large amount of disks) while other mechanisms are in place to avoid any kind of misbehave of the cluster even in the worst scenarios. Pools can also be moved between the nodes intentionally for maintenance reasons or manual IO rebalancing.

Advanced snapshots and remote replica

Syneto’s backup and replication functionalities are based on ZFS space-efficient snapshots, clones and snapshot send/receive service. The user can set up schedules for hourly or daily backups (snapshots) and apply specific retention policies. In the same interface it is also

possible to specify a remote ZFS repository for replicating data in a secondary appliance. Once configured, this set of features allows to protect data files locally and create simple replicas of the volumes for disaster recovery.

An integration with VMware, discussed in the following chapter, is also available to take consistent snapshots of VMware VMs.



Why it is important for you

HA functionality and snapshots are fundamental characteristics of any modern enterprise storage solution. Snapshots in Syneto Storage OS can be very granular thanks to ZFS (it is possible to set up many different backup schedules), this functionality covers the needs of most SMB organizations and it is very easy to use. Remote snapshots replication is another nice feature which can be used to move data to a secondary site for Disaster Recovery.

INTEGRATION WITH VMWARE

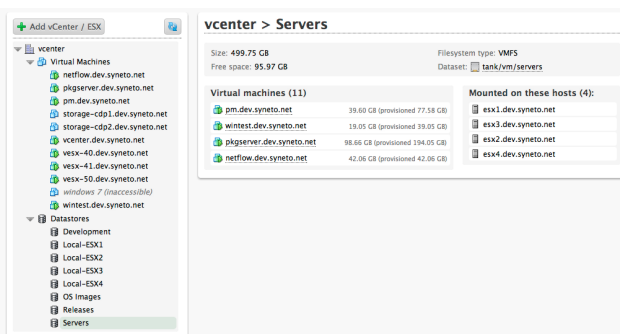
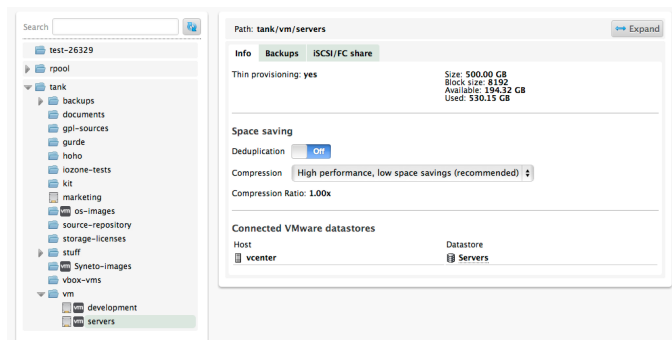
Snapshots and clones with VMware

One of the nicest features available on Syneto Storage OS is the integration with VMWare. Syneto has integrated its product with VMWare API very well and can have a complete view of the VMs stored in shared volumes.

ZFS native space-and-performance-efficient snapshots can be taken safely and consistently without limits both in terms of quantity and time, overcoming the notorious constraints of native VMware snapshots. Furthermore, Syneto's scheduler can be configured to transparently take consistent VM snapshots on a time basis.

VM snapshot taken by Syneto can then be converted (cloned) in full functional VMs and can be started or reused at any time.

Operations are managed at the datastore level (e.g. NFS share) but, once again, Syneto Storage OS hides this complexity and the user sees everything managed at the VM level. Even complex operations, like expanding a storage LUN, and consequently the VMFS datastore, are seamlessly managed through the UI.



Syneto Storage OS leverages all ZFS characteristics to take full advantage of this integration and features like Deduplication, flash memory, variable block size and cloning make this storage solution a good companion for VMware environments. Clones of VMs can be created at a very high

speed, enabling Syneto to support VDI environments with a reasonable \$/IOPS.

The plug-in for vCenter completes the integration and gives a comprehensive view of the storage from VMware vCenter management console.

Why it is important for you

This level of integration is not unique in the market, but it is usually available on much more expensive solutions and clearly puts Syneto Storage OS in a good position when compared to other similar storage systems.

Syneto's integration does not support VMware SRM (a disaster recovery automation tool) at the moment but it's also true that this kind of tools is not widely adopted by SMB organizations.

ONE OS, MANY POSSIBILITIES

Licensing model

Syneto Storage OS is licensed on a feature and Terabyte basis. This actually means that the licensing is somewhat complicated but, on the other hand, the end user only pays for the needed features and space in a pay-as-you-grow fashion.

On the contrary of most storage vendors Syneto Storage OS licenses are perpetual, which means a great investment protection for the end user. In fact, licenses can be moved from one appliance to another saving money at each hardware generation upgrade.

A VSA (virtual storage appliance), usually provided for demo purposes, is also available. This VSA is full-featured and can be utilized in specific vertical use cases when fully licensed.

Hardware appliances

Syneto has a complete line of appliances ranging from tiny (4 disk) single controller boxes (useful for very small or remote offices) up to over 1 PB size HA systems and custom solutions for specific needs. The OS, and the set of functionalities is identical, granting the end user a consistent interface and same modus operandi through all deployments. A next to be released Syneto Storage OS version will also provide the ability to virtualize external storage, allowing the end user to buy only the HA controllers and reuse its old storage.

Syneto OS is also available through OEM partners which build their own hardware certified solutions.

Why it is important for you

Storage OS is the core and one key advantage of Syneto, when compared to similar ZFS solutions, is the end-to-end integration and, consequently, a better user experience through an easier to use and better serviceable solution.

BOTTOM LINE

Syneto Storage OS offers a broad set of features and has the right characteristics to serve very well modern small to medium sized enterprises for their primary storage needs.

A full featured hybrid unified storage solution, easy to use and well integrated with VMware environment is what this kind of organization really needs and is asking for.

At the same time, Syneto Storage OS can surely be considered as a viable option in many different use cases from larger enterprises too. Especially when a broad set of features and good \$/GB are important key aspects. Data footprint reduction techniques, like deduplication and compression, can dramatically drive down TCA while advanced replication capabilities open up new and cost effective opportunities. For example, deploying small appliances in remote offices which can be automatically protected and replicated to a central site.

Key features, like local virtualization and the impressing quality of VMware integration, really help the product to stand out in a crowd, making the real difference when it comes to the competition.

Syneto Storage OS roadmap looks really interesting with added improvements on various key aspects of the product. Thanks to the perpetual licensing model, end users will benefit from these enhancement when available.

JUKU

Why Juku

Jukus are Japanese specialized cram schools and our philosophy is the same. Not to replace the traditional information channels, but to help those who make decisions for their IT environments, to inform and discuss the technological side that we know better: IT infrastructure virtualization, cloud computing and storage.

Unlike the past, today those who live in IT should look around themselves: things are changing rapidly and there is the need to stay informed, learn quickly and to support important decisions, but how? Through our support, our ideas, the result of our daily interaction that we have globally on the web and social networking with vendors, analysts, bloggers, journalists and consultants. But our work doesn't stop there, the comparison and the search is global, but the sharing and application of our ideas must be local and that is where our daily experience, with companies rooted in local areas, becomes essential to provide a sincere and helpful vision. That's why we have chosen: "think global, act local" as a payoff for Juku.

Author



Enrico Signoretti, consultant, trusted advisor and passionate blogger (not necessarily in that order). Having immersed into IT environments for over 20 years, his career began with Assembler in the second half of the 80's before moving on to UNIX platforms (but always with the Mac at heart) until now when he joined the "Cloudland". During these years his job has changed from deep technical roles to management and customer relationship management. In 2012 he founded Juku consulting SRL, a new consultancy and advisory firm highly focused on supporting end users, vendors and third parties in the development of their IT infrastructure strategies. He is constantly keeping an eye on how market evolves and continuously looking for new ideas and innovative solutions. You can find Enrico's social profiles here: <http://about.me/esignoretti>

All trademark names are property of their respective companies. Information contained in this publication has been obtained by sources Juku Consulting srl (Juku) considers to be reliable but is not warranted by Juku. This publication may contain opinions of Juku, which are subject to change from time to time. This publication is covered by [Creative Commons License \(CC BY 4.0\)](#): Licensees may cite, copy, distribute, display and perform the work and make derivative works based on this paper only if Enrico Signoretti and Juku consulting are credited. The information presented in this document is for informational purposes only and may contain technical inaccuracies, omissions and typographical errors. Juku consulting srl has a consulting relationship with Syneto. This paper was commissioned by Syneto. No employees at the firm hold any equity positions with Syneto. Should you have any questions, please contact Juku consulting srl (info@juku.it - <http://jukuconsulting.com>).