



Benefits of Using SSDs in Infortrend's ESVA Storage Systems

Application Note

Abstract

This application note examines the benefits of using SSDs in Infortrend's ESVA storage systems and offers general guidance on how SSD drives could be best deployed in ESVA systems.



Infortrend ESVA (Enterprise Scalable Virtualized Architecture)

Storage Systems

The Infortrend ESVA (Enterprise Scalable Virtualized Architecture) Series is a leading storage solution designed for mid-range enterprise SAN. At affordable prices, it meets mission-critical storage demands for performance, scalability and reliability with advanced hardware designs and comprehensive data services. On the innovative Enterprise Scalable Virtualized Architecture, various features, including storage virtualization, thin provisioning, distributed load balancing, automatic data migration, prioritized volume accessibility, snapshot and replication, are consolidated to realize optimal business benefits. With ESVA systems, users can optimize returns of investment, simplify storage infrastructure, and maximize application productivity.

For more information about Infortrend's ESVA storage systems, please visit our website:
<http://esva.infortrend.com/>

SSD Support on Infortrend's ESVA Storage Systems

A number of ESVA storage system models offer support for STEC Zeus IOPS SSDs (Solid State Drive)¹, including two different capacity options. Besides SSDs, these models can also accommodate high-performance SAS drives and large-capacity nearline drives. By taking advantage of the special characteristics of each drive type, storage utilization can be optimized so that each application achieves the performance level it requires.

¹ For detailed information about SSD support on ESVA models, please visit the Infortrend website:
<http://esva.infortrend.com/>



SSD Benefits

SSDs offer a number of benefits, including higher IOPS performance, better reliability and better energy-efficiency. In enterprises, the performance provided by SSDs can greatly benefit applications such as database, OLTP, email, HPC (High Performance Computing), business intelligence etc.

According to Infortrend's internal testing based on SPC-1 standards, in ESVA storage systems a single SSD can deliver the combined performance of sixteen 15,000 RPM SAS drives. With a SSD-based configuration, users can achieve the same optimized performance at 20% lower price/performance and 50% less response time. The enterprise-level SSDs supported by ESVA deliver two million hours of MTBF (Mean Time Between Failures), which is much higher than the one to 1.5 million hours MTBF of hard disk drives.

Since SSDs have much higher read/write performance than hard drives, they also support faster RAID rebuilds. Without any mechanical parts, SSDs can better tolerate vibration and extreme temperatures, making them especially suitable for harsh environments. The non-mechanical structure of SSD further leads to another benefit, low power consumption. Compared to hard drives, users can enjoy 80% less power consumption when using SSDs to achieve the same performance.

SSD Benefits	Details
High performance	A single SSD can deliver the combined performance of sixteen 15,000 RPM SAS drives
Low response time	Up to 50% less response time than traditional hard disk drives
Excellent price/performance	Same optimized performance at 20% lower price/performance
Long product lifespan	Two million hours of MTBF; much higher than the one to 1.5 million hours MTBF of hard disk drives
Better tolerance for harsh environments	With a non-mechanical structure, SSDs can better tolerate vibration and extreme temperatures
Low power consumption	Up to 80% less power consumption when using SSDs to achieve the same performance in Infortrend ESVA systems

Table 1: Benefits of Using SSDs in Infortrend ESVA Storage Systems



SSD Performance

As mentioned above, using SSDs in ESVA systems can deliver significant performance advantages. **Table 2** below gives an indication of SSD performance in Infortrend's ESVA systems. Performance results were obtained through Infortrend's internal testing based on SPC-1 standards.

SSD Performance Results in a Tested Configuration Consisting of One (1) ESVA F70 System with Four (4) SSDs and Twelve (12) Nearline Drives	
Storage Array	One (1) ESVA F70 storage system
SPC-1 IOPS	20,432
SPC-1 Price-Performance	US\$3.83/SPC-1 IOPS
Response time	5.00ms
Total ASU Capacity	292GB
Data Protection Level	RAID 1
Number of drives	Four (4) SSDs and twelve (12) nearline drives
Drive type	<ul style="list-style-type: none">• 146GB STEC ZeusIOPS SSD• 1TB 3.5" 7,200 RPM Nearline drives
Total TSC Price (incl. 4 SSDs and 12 Nearline drives)	US\$78,274

Table 2: SPC-1-based Performance of SSDs in Infortrend ESVA Storage Systems

Notes:

- The performance results shown in **Table 2** were obtained through internal testing by Infortrend based on SPC-1 standards. The results are for reference, and have not been audited and certified by the Storage Performance Council (SPC).
- The **SPC-1 IOPS**, **SPC-1 Price-Performance**, **Response time**, and **Total ASU Capacity** results are obtained by testing the four SSDs and therefore only apply to the SSDs. In the tested configuration, the nearline drives are not part of I/O operations and are assigned to secondary tasks such as data back-up.
- SPC-1 IOPS represents the maximum I/O request throughput at the 100% load point.
- Total ASU (Application Storage Unit) Capacity represents the total storage capacity read and written in the course of executing the test.
- TSC: Tested Storage Configuration



SSD Deployment in Infortrend's ESVA Storage Systems

ESVA systems featuring SSD support can accommodate 16 drive bays. A wide range of options is available as to how different disk types are deployed. If users adopt SSDs, a configuration that can lead to optimal performance and offers an excellent balance between cost, performance and capacity consists of 12 SAS/nearline drives plus four SSDs.

As mentioned above, SSDs are well suited for high-performance, high-IOPS applications. Other drive types can thereby be adopted for applications with lower performance requirements, or for other uses such as high-capacity backups. By assigning different types of applications to different types of drives based on performance characteristics, applications can achieve ideal service levels. Enterprises can thereby optimize their storage utilization and avoid situations whereby applications are assigned to drive types that offer more or less performance than is required.

In arrays featuring both SSDs and nearline drives, another option for users is to deploy volume copies. Critical data on the SSDs can thereby be copied to nearline drives, ensuring that this data is properly protected and always available in the event of problems with the SSDs.

