

High-Performance Cybersecurity: Unleashing Unprecedented Efficiency with Altos High-Performance NVMe SSD Storage

Efficiency Unleashed: Enhancing Performance and
Safeguarding Data Integrity

WHITE PAPER



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Abstract

This white paper explores the transformative impact of integrating Altos BrainSphere™ R380 F5 alongside Altos High Performance NVMe SSD Storage solution, a solution specifically designed for processing large amounts of data and complex calculations and analysis. Equipped with the latest processor technology and revolutionary NVMe SSD storage protection by Graid Technology, this solution plays a pivotal role in network packet analysis applications.

Traditionally, employing five systems with a cumulative SAS capacity of 320TB for Ceph analysis demanded an extensive 94-hour processing period. However, through the adoption of a singular Altos BrainSphere™ R380 F5 coupled with Altos High Performance NVMe SSD Storage solution featuring NVMe 60TB in RAID 5 configuration, the analysis duration drastically decreased to a mere 10 hours. Remarkably, utilizing solely one Altos BrainSphere™ R380 F5 with NVMe 60TB in RAID 5, excluding Altos High Performance NVMe SSD Storage solution, would still require 54 hours for analysis.

This paper underscores the unparalleled performance enhancements achieved through this innovative amalgamation, signaling a paradigm shift in network packet analysis efficiency and efficacy, and being highly recognized and adopted by the leading player in the cloud security market.

Introduction

Challenge

In network packet analysis applications, the processing of vast amounts of data and data security presents a significant bottleneck. A large amount of data often leads to prolonged analysis times and compromised efficiency, which also increase the risk of data security. Traditional storage solutions struggle to keep pace with the demands of real-time data processing, resulting in delays and performance limitations. This challenge is exacerbated by the complexity of network traffic and the need for intricate analysis algorithms. Moreover, as data volumes continue to escalate, the inadequacy of conventional storage systems becomes increasingly apparent. Recognizing this critical bottleneck, the integration of Altos High Performance NVMe SSD Storage solution emerges as a pivotal solution.

Solution-Altos High Performance NVMe Storage Solution

The Altos BrainSphere™ series servers, as a high-performance computing solution in the market, are specifically designed for handling large amounts of data and complex calculations and analysis. Equipped with the latest processor technology and the revolutionary NVMe SSD storage protection and acceleration technology SupremeRAID™ by Graid, this groundbreaking NVMe SSD storage technology unleashes existing CPU resources, providing the fastest computational efficiency in the market while simultaneously ensuring comprehensive data security protection. This series of servers offers ultimate analysis speed, guaranteeing the efficiency,

accuracy, and security of data processing.

Altos BrainSphere™ series servers

The Altos BrainSphere™ R380 F5, equipped dual Dual 3rd Gen Intel Xeon Scalable processors up to 270W TDP series processors, is a robust two-socket 2U system that is ideal for almost any type of applications. This dynamic and balanced system can function as a database server for big data analytics, a computing node for your HPC (High-Performance Computing) environments, or used for virtualization purposes in your cloud infrastructure.



SupremeRAID™ SR-1010

This next-generation GPU-accelerated RAID removes the traditional RAID bottleneck to deliver maximum SSD performance without consuming CPU cycles or creating throughput bottlenecks for unmatched flexibility, performance, and value. It's a PCIe Gen 4 card that supports up to 32 SSDs, and delivers superior performance and flexibility for 2U cloud and enterprise servers.



Testing Environment

Configuration1

- Server: Altos BrainSphere™ R380 F5 x 5
- CPU: Xeon Sliver 4310 12core 2.1GHz
- Memory: 16x 16GB DDR4 RDIMM
- Storage: 10 x 8TB SAS 7200RPM
- OS Driver: 2x 1TB SSD

Configuration1		unit	Total units
Processor	Xeon Silver 4310 12core 2.1GHz	2	10
Memory	16 x 16GB DDR4 RDIMM	256GB	1.2TB
Storage	10 x 8TB SAS 7200RPM	80TB	400TB
OS Driver	2 x 1TB SSD	2TB	10TB
Ceph			

Configuration2

- Server: Altos BrainSphere™ R380 F5 x 1
- CPU: Xeon Sliver 6330 28core 2.0GHz
- Memory: 32x 16GB DDR4 RDIMM
- Storage: 20x 3.2TB U.2 NVMe
- OS Driver: 2x 3.2TB U.2 NVMe

Configuration2		unit	Total units
Processor	Xeon Silver 6330 28core 2.0GHz	2	2
Memory	32 x16GB DDR4 RDIMM	512GB	512GB
Storage	20 x 3.2TB U.2 NVMe	64TB	64TB
OS Driver	2 x 3.2TB U.2 NVMe	6.4TB	6.4TB
RAID 5 (OS RAID)			

Configuration3

- Server: Altos BrainSphere™ R380 F5 x 1
- CPU: Xeon Sliver 6330 28core 2.0GHz
- Memory: 32x 16GB DDR4 RDIMM
- Storage: 20x 3.2TB U.2 NVMe
- OS Driver: 2x 3.2TB U.2 NVMe
- RAID Controller: SupremeRAID™ SR-1010 x 1

Configuration3		unit	Total units
Processor	Xeon Silver 6330 28core 2.0GHz	2	2
Memory	32 x16GB DDR4 RDIMM	512GB	512GB
Storage	20 x 3.2TB U.2 NVMe	64TB	64TB
OS Driver	2 x 3.2TB U.2 NVMe	6.4TB	6.4TB
Graid : RAID 5			

Conclusion

The utilization of Altos BrainSphere™ R380 F5 in conjunction with the Altos High Performance NVMe SSD Storage solution has resulted in a significant performance boost, particularly in network packet analysis applications. In the initial setup, where five systems with a total SAS capacity of 320TB were employed for Ceph analysis, the analysis process took an extended 94 hours. However, by transitioning to just 1 Altos BrainSphere™ R380 F5 paired with Altos High Performance NVMe SSD Storage solution using NVMe 60TB in RAID 5, the analysis time was remarkably reduced to a mere 10 hours.

Network Packet Data 25TB

	5 unit 	1 unit 	1 unit 
Configuration	Xeon Silver 4310 12core 2.1GHz 16 x 16GB DDR4 RDIMM 10 x 8TB SAS 7200RP 2 x 1TB SSD	Xeon Silver 6330 28core 2.0GHz 32 x 16GB DDR4 RDIMM 20 x 3.2TB U.2 NVMe 2 x 3.2TB U.2 NVMe	Xeon Silver 6330 28core 2.0GHz 32 x 16GB DDR4 RDIMM 20 x 3.2TB U.2 NVMe 2 x 3.2TB U.2 NVMe + Graid SupremeRAID
Storage type	Ceph	RAID 5 (OS Raid)	RAID 5
Available capacity	SAS 8TB x 8 x 5台/3=8TB x 40 (320TB)/3= 106.6TB	NVMe 3.2TB x (20-1) x 1台=3.2TB x 19 (60.8TB)	NVMe 3.2TB x (20-1) x 1台=3.2TB x 19 (60.8TB)
9 x 90% time saving			
Performance IOPS	11.7 K	7.1 x 83.9 K	1.2 x 105.6 K
Performance (Processing time)	94 hrs	40% time saving 54 hrs	82% time saving 10hrs

The benefits of the test results showcasing the utilization of Altos High-Performance NVMe SSD Storage solution are as follows:

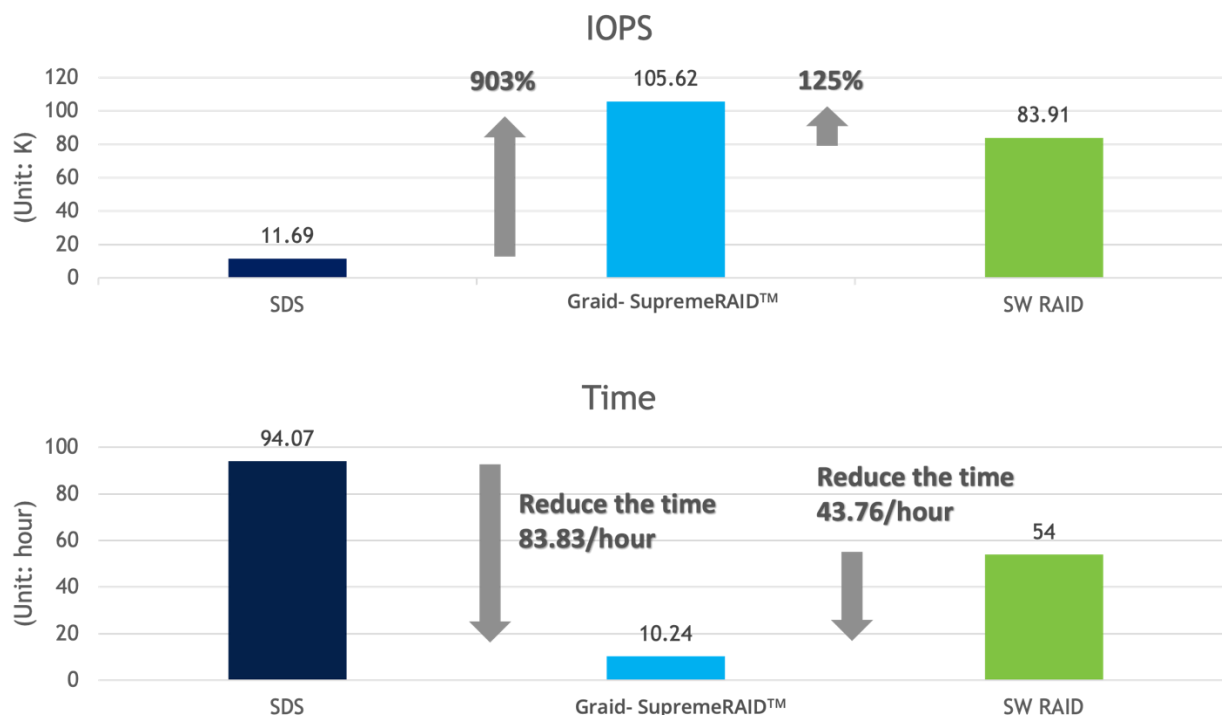
1. **Significant Performance Boost:** The integration of Altos BrainSphere™ R380 F5 with Altos High-Performance NVMe SSD Storage solution has led to a remarkable increase in performance, especially in network packet analysis applications. This improvement enables faster decision-making and response times in critical network analysis scenarios.
2. **Drastic Reduction in Analysis Time:** Transitioning from five systems with a total SAS capacity of 320TB to just one Altos BrainSphere™ R380 F5 paired with Altos High-Performance NVMe SSD Storage solution resulted in a significant reduction in analysis time, **from 94 hours to a mere 10 hours.** This indicates a substantial improvement in processing efficiency.
3. **Cost Savings:** By consolidating the infrastructure to a single Altos BrainSphere™ R380 F5 with Altos High-Performance NVMe SSD Storage solution, there are potential cost savings in terms of hardware maintenance, energy consumption, and overall infrastructure management, **from 5 servers decrease to 1 Altos BrainSphere™ R380 F5 server be deployed.**
4. **Versatility and Scalability:** The flexibility and scalability offered by Altos High-Performance NVMe SSD Storage solution allow for future expansion and adaptation to evolving analysis requirements, ensuring long-term viability and relevance of the solution.
5. **Competitive Advantage:** The remarkable reduction in analysis time and the superior performance achieved with this integration provide a competitive edge in network packet analysis applications, enabling organizations to stay ahead in rapidly evolving cybersecurity landscapes.

Performance Analysis

In the original setup, five systems were used, with one equipped with 10 SAS hard drives of 8TB each, totaling a capacity of 320TB for Ceph computation. The IOPS (Input/Output Operations Per Second) value in this configuration was 11.69K. However, due to the limited transmission speed of SAS hard drives, the system's performance could be constrained.

To enhance storage system performance, a decision was made to revise the architecture. Initially, the configuration was changed to utilize only one server, paired with 20 NVMe SSDs of 3.2TB each in an OS RAID 5 setup. This adjustment resulted in an improved IOPS value of 83.9K, showcasing the positive impact of high-speed NVMe SSD transmission on performance.

Finally, the introduction of Altos BrainSphere™ R380 F5 and Altos High Performance NVMe SSD Storage solution, along with 20 NVMe SSDs in a RAID 5 configuration, yielded an IOPS value that was 9 times higher than the original setup, reaching an impressive 105.6K. This highlights the remarkable effectiveness of Altos High Performance NVMe SSD Storage solution in enhancing storage performance, indicating a substantial overall improvement in system efficiency





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