

Accelerating Seagate's In-house Global Operations

Case Study

Challenges

- Expand the SeaTrack system beyond 400,000 drive builds per day to meet growing demands.
- Improve drive builds per day while reducing Opex and Capex.
- Maintain high availability

Solution

- Utilize open source software and new flash accelerated storage architecture
- Replace the expensive and performance-limited SAN with Nytro flash add-in card

Benefits

- Exceeds the goal of 900,000 drive builds per day by achieving 1.2 million drive builds per day
- Achieves lower cost through open source technologies and reduced hardware expenses and power costs with the Nytro AIC
- Maintains 24x7 availability with redundant Nytro AICs across servers

Nytr[®] Flash Add-In Card Enables Optimal Performance for SeaTrack Application

One of Seagate's primary Global Operations IT teams is responsible for developing and maintaining systems that control and monitor analytics for the drive manufacturing process. This team, based out of the Shugart building in Singapore, utilizes a tool called SeaTrack as its single means for ensuring the quality and stability of Seagate's HDD platters, head and entire HDD drive assembly. Seagate has supported SeaTrack since the 1990s.

SeaTrack: Keeping up with Internal Demands

SeaTrack's system software and hardware platforms have constantly evolved over the years as the team has moved to address the ever-growing and changing needs of its multitenant production line support system.

The previous iteration of the SeaTrack system comprised many components. On the software side, these included an Oracle database and a VMware virtualization environment that supported drive shop floor applications running on the Red Hat Linux operating system. On the hardware front, the configuration included a high-performance storage system that used an HDD-based storage area network (SAN) and proprietary IBM servers.

When developing the latest SeaTrack deployment, the Shugart team had several objectives in mind, chief among them being to meet a higher number of drive builds per day, which would require improved performance and lower latency from the storage. The team also sought to maintain 24x7 high-data availability as well as to develop a more cost-effective solution by reducing Capex and Opex. To achieve these objectives, the team decided that the new configuration would utilize open source software, its existing standard x86 servers and Seagate's own storage.

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The Newest Evolution

The resulting solution is an architecture that now includes the following components:

- PostgreSQL database in place of Oracle
- CentOS operating system in place of Red Hat
- CentOS KVM virtualization in place of VMware
- Seagate Nytro® XP6500 flash add-in cards (AIC) installed in standard x86 servers in place of the SAN

These changes to the SeaTrack architecture were implemented for the following reasons:

• Open Source for Lower Costs

The open source software components—including PostgreSQL, CentOS and Cent OS KVM virtualization—are all powerful and proven enterprise-class components that provide high availability and utilize live virtual-machine and storage-migration technology. These open source technologies also eliminate the need to purchase licensing and maintenance fees.

• Nytro SSDs for Improved Performance

The Seagate Nytro XP6500 add-in card (AIC) provides high-endurance, high-performance and low-latency storage that exceeds that of the previous SAN. The Nytro card was also selected for the following benefits:

- Boosts application responsiveness and delivers highly predictable performance
- Achieves a smaller footprint with installation directly in the server
- Reduces cooling and power costs required by a SAN
- Removes the need for a complete hardware overhaul, as it can be installed into existing servers
- Easy to use, requiring minimal IT intervention
- Provides improved IO performance during VM Live migration if one of the redundant SeaTrack systems fails

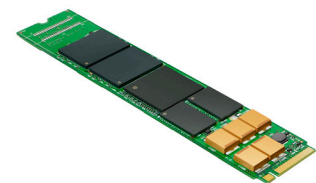
It is important to note that the same or better results can also be accomplished using a range of Seagate's SSD technology, including the Nytro XP7200 AIC or the Nytro XF1440 or XM1440 NVMe SSDs.



Nytro XP7200 Add-in Card



Nytro XF1440 2.5" NVMe SSD



Nytro XM1440 M.2 NVMe SSD

• High Availability

High availability and data redundancy is accomplished using two servers, CentOS KVM and two XP6500 AICs receiving drive manufacturing metrics and tracking information on both servers simultaneously. If one server fails, the other provides continuous data availability. Additionally, one Nytro XP6500 has sufficient performance to continue without compromising the drive build throughput.

Significant Improvements in Drive Builds per Day

Before the SeaTrack upgrade, the system and storage provided a maximum of 300,000 to 400,000 drive builds per day. The upgrade team set a goal to more than double that range in the new SeaTrack system, looking at numbers between 700,000 and 900,000.

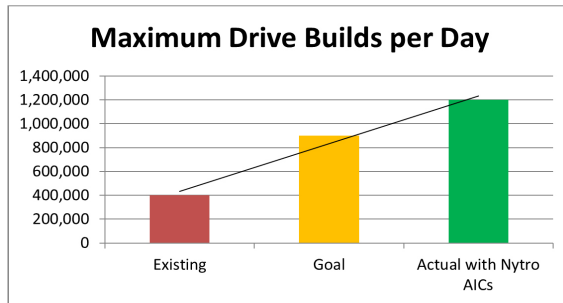
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However, during the proof-of-concept stress testing of the new system, which used a single Nytro® X6500 flash AIC, the system achieved an astonishing 1.2 million drive builds per day, far exceeding the established target! And if additional capacity or performance is required, this solution can seamlessly scale by simply adding another Nytro flash AIC into the server.

"The Nytro XP6500 is the performance of a SAN in the palm of your hand."

YeowChew Lee
Sr. Manager
Global Operations IT - Seagate



Conclusion

Using open source software and a range of Seagate's Nytro SSD technology, the original goals—which included reducing Capex and Opex costs, supporting the required number of drive builds per day and maintaining high availability—were all met or exceeded. The success of the new in-house SeaTrack system demonstrates the potential of new cost-effective and high-performance system architectures utilizing the latest technologies available from Seagate.

To Learn More:

For more information on Seagate Nytro XP6500, visit <http://www.seagate.com/enterprise-storage/solid-state-drives/nytro-xp6500-accelerator-card/>

For more information on Seagate Nytro Solid State Drives, visit <http://www.seagate.com/Nytro>

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Seagate Technology LLC 10200 South De Anza Boulevard, Cupertino, California 95014, United States, 408-658-1000
Seagate Singapore International Headquarters Pte. Ltd. 7000 Ang Mo Kio Avenue 5, Singapore 569877, 65-6485-3888
Seagate Technology SAS 16-18, rue du Dôme, 92100 Boulogne-Billancourt, France, 33 1-4186 10 00

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