NetApp Bridging NVMe, HDDs, and Servers

FuzeDrive technology provides performance boost to E-Series array

Key Benefits

Improves Application Performance

- SSD performance at a low $/GB
- Multiple configurations to optimize your SSD dollars
- File-specific pinning option
- Self-optimized performance in real time

Lets You Implement the Latest Technology Using Existing Infrastructure

- Enables you to take advantage of NVMe flash today
- Tier host–based storage to NetApp® E-Series
- Tier internal E-Series storage
- Visual monitoring tools for easy validation of performance

Works with a Large Number of Applications

- MongoDB, Couchbase, Cassandra
- Microsoft SQL, MySQL, Oracle
- Microsoft Exchange, SharePoint
- Video editing, video streaming

Need for Flash in the Data Center

Flash media has changed the data center. Advancements in flash technologies happen faster than most IT organizations can afford to adopt, but this situation has not stopped the desire to benefit from the speeds of the newer technologies. Upgrading to new flash technology requires changes in the IT infrastructure, including implementing an all-flash solution, even a hybrid system. All-flash solutions provide top performance, but may not be necessary in all environments. The rising popularity of NVMe flash further complicates IT organizations' ability to integrate this technology. For some environments what is needed is a cost-effective method of adopting emerging flash technology without requiring forklift changes to infrastructure.

Keeping Pace with Flash Technology

NetApp is partnering with Enmotus to deliver a server-based solution that utilizes Enmotus's FuzeDrive technology. This technology allows IT environments to bridge the gap between new flash technologies at an affordable price and to target the applications that need the newer technology while leveraging existing infrastructure.

Enmotus FuzeDrive Technology

Enmotus FuzeDrive behaves like an SSD but costs up to five times less, thereby satisfying environments that need performance as well as capacity. FuzeDrive is a software solution that resides on the application server. Virtualization blends fast storage media with cost-effective capacity storage in a single virtual drive that presents itself to the operating system as an SSD. Patented MicroTiering technology works continuously in the background to ensure that your active data always resides on your fastest storage media, delivering flash performance. Rarely accessed data is migrated to the capacity media, but it can be promoted to the fast tier in real time when necessary. Visual monitoring tools make it easy to validate that your system is running at peak efficiency. FuzeDrive provides IT managers with a true hands-off automated data migration capability for each server they manage.

The Solution

FuzeDrive combined with NetApp E-Series arrays provides IT managers with the capability to enhance the performance of their arrays using the latest flash technology and without needing infrastructure updates. Three different implementations provide the flexibility to meet your individual performance and price targets.

- The first configuration creates a virtual SSD from SSDs and HDDs that are internal to the E-Series storage array.
- The second configuration provides a compelling option to use server-based SSDs if you require performance improvement and the E-Series storage array does not have any open slots for drives.
- The third and most exciting opportunity is being able to virtualize E-Series drives with server-based NVMe drives. Doing so provides you with a method to leverage NVMe technology on the entire E-Series or EF-Series system.

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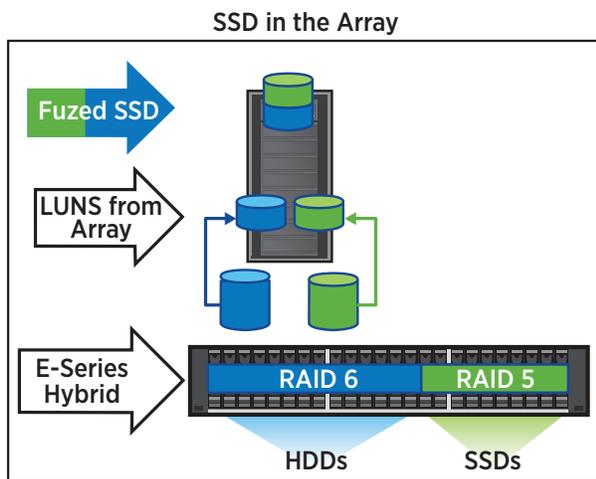
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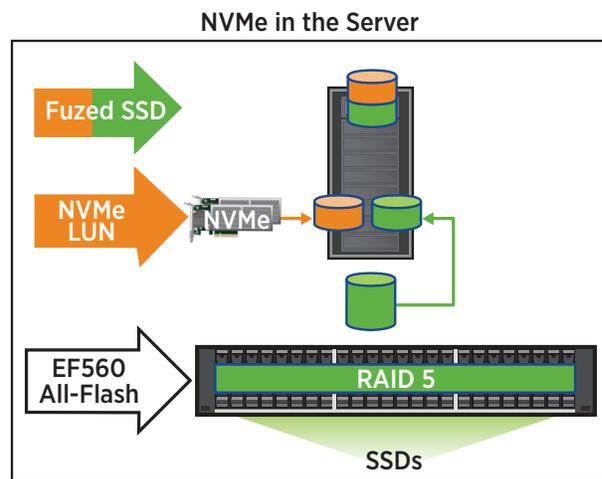## FuzeDrive Performance

Figure 1

Figure 2

Figure 1, above, shows the performance improvements using the NetApp and Enmotus solution. The baseline represents an E-Series array populated with 100% hard drives and no FuzeDrive software. In the other two configurations, Enmotus FuzeDrive software was loaded on the server and combined the different storage tiers into a single LUN presented to the operating system.

The second bar in figure 1, SSD in the array, uses a mix of Fuzed SSDs and HDDs internal to the E-Series array. The configuration is shown in figure 2. In this configuration, there is an 800% increase in IOPS and latency drops from over 12ms down to about 7ms.

The third bar in figure 1, NVMe in the server, was configured with SSDs from the E-Series array and NVMe cards in the server, and is shown in figure 3. In this configuration, with the NVMe local to the servers, there was an 1800% increase in IOPS and a 12-times decrease in latency.

About Enmotus

Enmotus develops storage automation and analytics software for data centers and web scale applications. Our products enable simple integration of block storage devices in servers and storage appliances to create high performance real-time automated tiered storage.

www.enmotus.com

About NetApp

Leading organizations worldwide count on NetApp for software, systems and services to manage and store their data. Customers value our teamwork, expertise and passion for helping them succeed now and into the future.

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