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by **imation**

7

SIMPLE
TRUTHS
ABOUT **HYBRID**
STORAGE

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THE RISE OF HYBRID STORAGE

Big Data is getting bigger all the time. The demand for storage capacity is rising 80 to 100 percent per year - and we haven't even begun to hit our stride. The data deluge won't just be big, it will be mind-boggling.

What's more, organizations like yours are constantly adding more applications: databases, analytics and virtualization that require exceptional I/O performance and low latency to meet the rapid response times your business demands.

HYBRID STORAGE DEFINED

Hybrid storage is a new category of primary data storage that leverages multi-core processors, DRAM, solid-state drives (SSD) and large capacity hard disk drives (HDD) with advanced "secret sauce" software in a potent combination that scales up capacity non-disruptively and provides the high performance that many applications need. Every kind of storage provider from big names to start-ups is entering the hybrid field.

*Now that you know a few facts about hybrid storage, you're ready to learn the **TRUTH**.*

Conventional can't keep up.

Hybrid storage is today's most powerful tool for handling the overwhelming data growth and extreme performance requirements that organizations face.

Fast-growing hybrid storage sales are expected to double

from $7B in 2013 to $14B in 2017 to comprise nearly half of the total external storage system market.* At a 21% annual growth rate, hybrid storage is quickly becoming the powerhouse of the data center.

*IDC Worldwide Hybrid External Storage System 2013-2017 Forecast

1

NOT ALL HYBRID STORAGE SYSTEMS ARE CREATED EQUALLY

Some storage vendors retrofit conventional storage with solid-state drives, while others design new systems optimized for solid-state technology.

But it takes more than SSD to make a real hybrid. It takes unique software functionality and the ability to dynamically manage data between SSD and HDD, using caching or tiering.

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CACHING IS MORE EFFICIENT THAN TIERING

The data path for caching is short and safeguarded. Read caching use predicative algorithms to proactively copy data from HDD to SSD for fast I/O. When the application looks for data and the data is stored in the cache, you get a cache hit and an accelerated read operation. All data continues to be stored in underlying RAID'ed HDD storage with copies of the most active data in the cache.

The data path for tiering is longer and more complicated. Data is dynamically moved between HDD and SSD storage automatically, using algorithms that predict the need for the moves. The SSD tier holds the only copy of the data in a system and uses a RAID-like data protection scheme. The overhead this creates impacts performance and capacity, because it requires extra SSD - and that adds to tiering's complexity.

CACHING

Data Path

LARGE
Cache Pool

SSD, DRAM

RAID
Calculations

HDD
Storage

Time 0 → Time N

TIERING

Data Path

SMALL
Cache Pool

RAID
Calculations

SSD
Storage

HDD
Storage

T I E R I N G

Time 0 → Time N
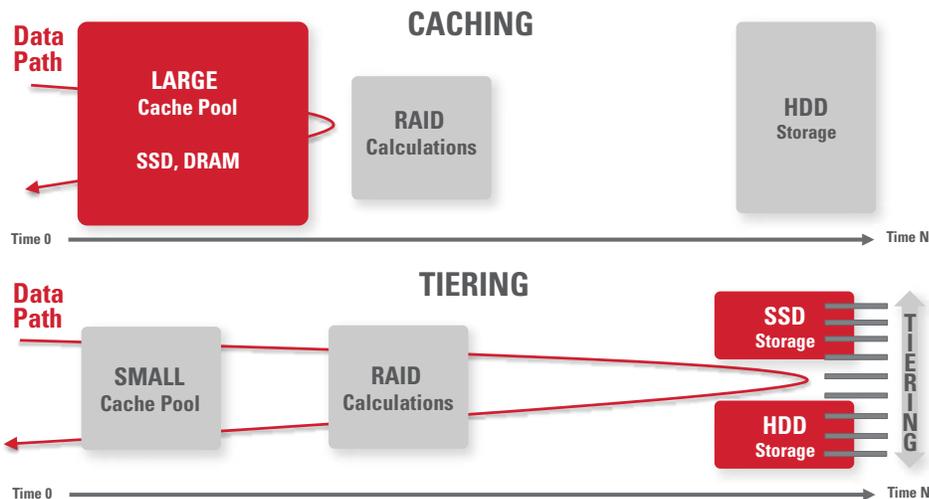
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DIFFERENCE MAKER: WRITE CACHING TECHNIQUE AND TYPE OF SOLID-STATE MEDIA

To create a hybrid storage system that can support a wide range of workloads, it's important to start by ensuring sufficient ability to handle the high performance write data critical for databases, VDI and similar applications.

The key is the system's efficiency in de-staging data from the write cache to the spinning HDD, and the choice of solid-state media used for that cache. The ideal method writes data to a fault-tolerant, DRAM-based write cache where the writes are acknowledged to the application as soon as they land in the cache. Then the cache aggregates the writes and de-stages them sequentially to HDD storage.

This approach ensures the highest possible write performance while eliminating wear-out issues and write penalties of using SSD for write caching.

4

CACHING CUSTOMIZATION = PERFORMANCE WHERE YOU NEED IT THE MOST

The way that hybrid storage systems leverage DRAM and SSD for write caching and read caching gives you better performance and longer flash life. But hybrid's most important feature is customizable read caches that let you decide how to maximize the use of premium priced SSD – for example, in serving virtual machines (VM).

Consider this scenario: a hypervisor processing multiple VM I/O streams will drive heavy random workloads on HDD storage and increase latency. But a customized read cache in front of the HDD volume eliminates this performance bottleneck.

Hybrid storage will even allow for 100% cache by configuring the SSD to the same size as the HDD volume. That kind of flexibility could be a real boon for your databases.

VM1 WEB SITE

VM2 BUSINESS INTELLIGENCE

VM3 CRM

VM4 EMAIL

VM5 DATABASE

VM6 COLLABORATION

HYPERVISOR

HDD

HDD

DRAM
SSD

UNIFIED HYBRID STORAGE
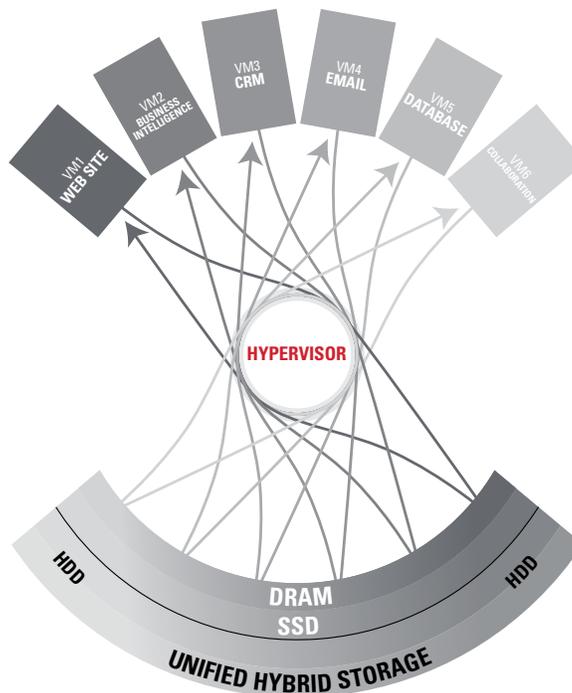
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BACKEND STORAGE INFRASTRUCTURE MATTERS

By enabling applications to respond lightning-fast, performance gets a lot of the glory in storage. But don't forget about the guts – the agile, efficient and reliable back-end storage infrastructure that deals with your data flood.

The best hybrid solutions offer a lot in terms of guts: density and space savings, non-disruptive capacity scalability, power and cooling savings, and offload task processing capabilities…all at an industry-leading low cost of ownership that any cost-constrained data center will prize.

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DON'T COMPROMISE YOUR DATA REDUCTION APPROACH

Hybrid storage offers several data reduction strategies that can add valuable space to your data center. Which you choose depends on your application and data type.

For data that is mostly unique, inline compression saves space and improves read/write performance while allowing an application to view compressed files or block in an uncompressed state.

If your IT environment contains a mix of replicated data, inline deduplication enables a hybrid storage system to store only the unique block or file data to HDD storage where it can be located no matter what former locations for the data are searched. It's a technique long used in backup applications, now increasingly vital in primary storage.

| VM4 **EMAIL** | VM5 **DATABASE** | VM4 **COLLABORATION** | ↔ | VM1 **WEB SITE** | VM2 **BUSINESS INTELLIGENCE** | VM3 **CRM** |

HYPERVISOR

| VMDK 4 | VMDK 5 | VMDK 6 |
| NFS | NFS | NFS |

HYPERVISOR

| VMDK 1 | VMDK 2 | VMDK 3 |

APPLIES FILES/DIRECTORY TO BLOCK STORAGE

NFS SHARES
HV MOUNTPOINTS

LUNS
ASSIGNED TO HV

UNIFIED HYBRID STORAGE
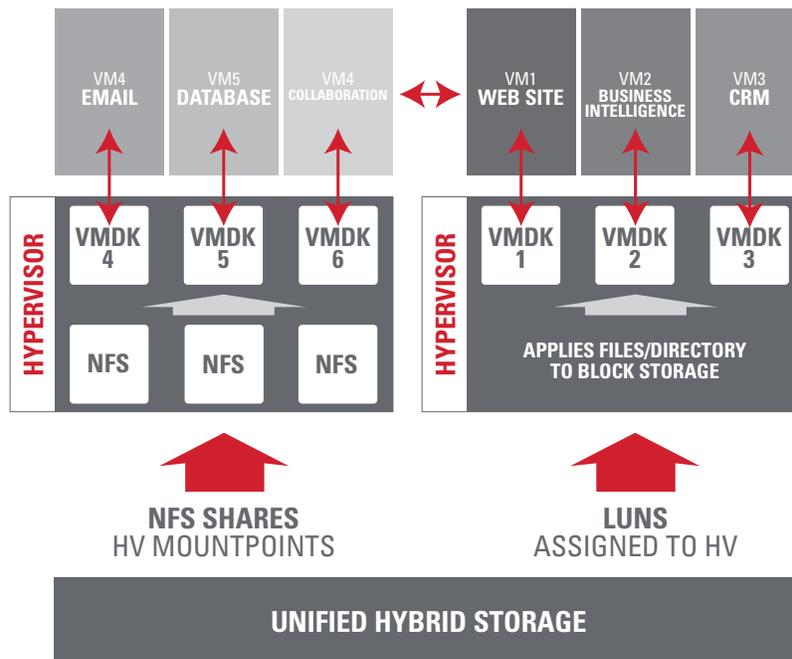
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THERE SHOULD BE NO HOST CONNECTIVITY LIMITATIONS

A lot of virtualization administrators swear by Fibre Channel.

However, iSCSI is gaining ground by taking advantage of higher speed 10 GbE and SAS storage systems.

And for deploying virtualization in environments where the IP penalty is acceptable, NFS tends to be the choice.

So which one should your hybrid system support?

Fibre Channel. And also iSCSI. And also NFS, CIFS, SMB and FTP, in a single software stack.

Because that's what it takes to create a hybrid storage system that is the applications-supporting workhorse your data center demands.

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Let's Talk Hybrid

Call an Imation Client Relationship Manager at
651.704.7491 or cbjerkeng@imation.com
to request a free assessment of how hybrid can handle
your storage needs.

See How Others Thrive

Businesses like yours are already meeting the challenges
of extreme data growth.
Read now

About Nexsan

Nexsan products are purpose-built for the needs of small-
to-mid-sized business: enterprise-class, easy-to-use and
efficient storage solutions with uncompromising value.
It's a different kind of storage experience.

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