The Data-Protection Playbook for All-flash Storage

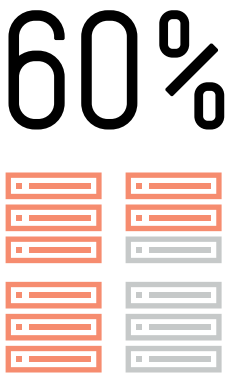
KEY CONSIDERATIONS FOR
FLASH-OPTIMIZED DATA PROTECTION

The future of storage is flash

The all-flash datacenter is a viable alternative

For the typical enterprise, the volume of data that needs to be managed and protected is growing at roughly 40% per year. Add to that the performance requirements of new applications and the demands for instant response time, always-on availability, and anytime-anywhere access. With such demands, datacenter managers face storage challenges that cannot be addressed using traditional, spinning-disk technology.

Typical enterprise data growth is roughly **40%** per year, with 60% of all storage space taken up by copies of data.[1]



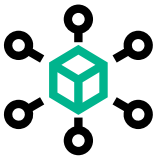
To meet these challenges, many enterprises are turning to flash storage. A viable flash-storage solution must provide:

Speed

High IOPS at predictable response times under 1 ms to drive more revenue-generating transactions

Affordability

Price parity with high-performance HDDs



Enterprise resiliency

Mission-critical availability and zero-data-loss RPO

Scale

Petabyte-scale for enterprise growth

While some flash vendors focus solely on speed or affordability, your flash solution needs to provide all four of the attributes above along with operational efficiencies that help reduce IT run rates. High-density, large-capacity flash arrays can reduce your storage footprint by 80%, with commensurate reductions in power and cooling costs. With the cost of flash storage now as low as $1.50 per usable GB, the all-flash datacenter is a viable alternative. The future of storage is all-flash.

[1] IT Spending Intentions Survey, ESG Research Report, IDC, February 2014

The future of data protection is flash-integrated flat backup

Converged backup solutions maximize performance and efficiency

If all-flash storage is a real option for enterprise datacenters, this raises a question: will existing data-protection schemes withstand the demands of an all-flash primary storage environment?

Global business and always-on availability requirements mean that you can't tolerate downtime. Add to that the cascading impact of failure in a virtual world, where a single hardware failure can take down multiple virtual servers and applications. The risk to your business, along with the operational costs of managing that risk, can be staggering.

Most enterprise environments have primary storage arrays and backup appliances based on disparate storage architectures with no integration, requiring backup solutions that are expensive to buy, complex to manage, and degrade the performance of the production servers you're trying to protect. Those are problems that you just can't afford in a high-performance environment.

For enterprises with revenue models that depend solely on the datacenter's ability to deliver IT and networking services to customers, downtime can be particularly costly, with the highest cost of a single event topping **$1 million** (more than $11,000 per minute).[2]

The alternative is a converged solution that integrates primary flash storage and backup appliances via a simple software-management solution, resulting in common data services and automation between devices for seamless data movement. Data protection becomes a function of primary storage, eliminating the need for additional backup infrastructures (media servers) and management (third-party backup applications). This makes protecting your data less intrusive on application processing, simpler to manage, and faster to complete.

Removing complexity leaves you with a 'flat' backup process that can provide fully-automated protection of your primary storage arrays, managed directly from your hypervisor or application interface. Data moves natively from primary storage to backup as scheduled by the business application owner, without the need for media servers or complex backup software.

If flash is the future of storage, then the future of data protection is flash-integrated flat backup.

[1] http://www.evolven.com/blog/downtime-outages-and-failures-understanding-their-true-costs.html

Evaluating data protection optimized for the future

Four key considerations

Improving data backup and recovery is always cited as one of the highest IT priorities by enterprises and midmarket organizations. If you're like most businesses, you want to improve efficiency and reduce the cost of data backup and recovery. How do you future-proof your investment in data protection to continue to support your migration toward flash storage?

Flash-integrated, flat-backup solutions extend **the performance of flash storage.**

As you shop for a data-protection solution for your flash environment, keep the following four important considerations in mind:

Consideration #1

Optimize for all-flash datacenters

Make the most of your flash investment

The primary lure of flash storage is performance, with hundreds of thousands, or even millions of IOPS at sub-millisecond latency. Achieving this requires a storage infrastructure that's optimized for flash.

Start with a flash-storage solution that offers Tier-1 data services and enterprise-class resiliency to defend against the top causes of application outages. Flash-integrated, flat-backup solutions deliver a robust set of features that allow you to extend the performance of your flash-storage environment. These include:

Every element, from network bandwidth to **data protection**, must be designed to take advantage of the performance characteristics of your flash arrays.

- High availability
- Global deduplication
- Data compression
- Data encryption
- Non-intrusive, application-consistent backups
- Capacity for thousands of concurrent backup streams
- Concurrent mix of Ethernet and FC networking protocols
- Virtual-appliance capability
- Scale-up and scale-out capacity to petabyte-scale
- Flexible deployment options
- Hypervisor integration with VMware® (run directly from your hypervisor)
- Programmable interface (RESTful API SDK) to enable plug-ins that support your application/database of choice

The right backup solution will also help you get more from your flash array by offloading snapshot data to a cost-effective deduplicating storage appliance. This not only frees up capacity on your flash array, it lets you retain more snapshots for longer periods, enabling more frequent recovery-point objectives (RPOs) and reducing the risk of data loss.

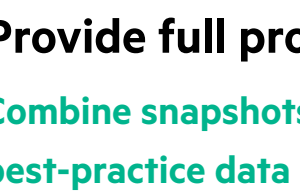
Consideration #2

Provide full protection

Combine snapshots with backups for best-practice data protection

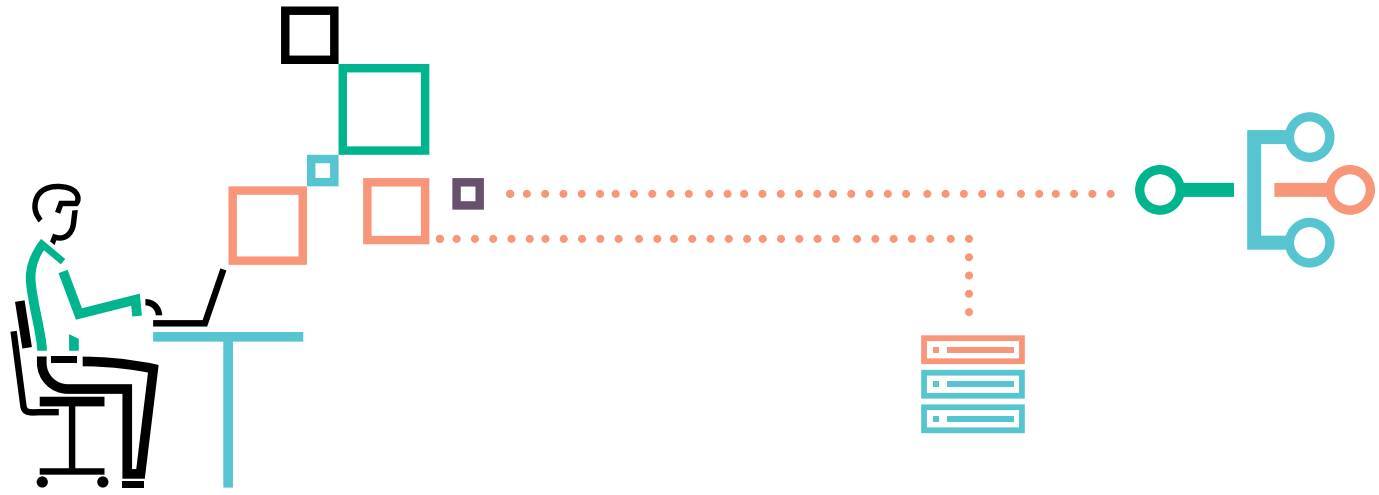
When it comes to best-practice data protection, no single snapshot or backup technology can provide a complete solution. Snapshots and backups have different, yet complimentary, roles to play for availability, backup, and disaster recovery.

Traditional backup-server processes provide reliable "off-box" recovery and retention, but they can also impact application performance and usually happen only once per day. Data typically flows through the application and backup server, impacting application performance and adding complexity and cost to data protection.



A snapshot sitting in primary storage is not **a true backup** until the data has been replicated to another storage system.

In high-availability virtual environments, snapshots are typically your first line of defense against data loss. Snapshots offer fast, non-disruptive, point-in-time copies of data, enabling you to meet tight Recovery-Point Objectives (RPOs) and minimal Recovery-Time Objectives (RTOs). Snapshots also have limitations, including limited retention times and vulnerability to corruption. Since snapshots reside on the same storage system as your data, they are at risk if your storage system fails. Snapshots alone can not provide the level of protection you need.



To be fully protected, you need to copy your data to protection storage. This protects your applications against file loss or application corruption beyond your oldest snapshot, and also protects your applications against storage-platform outages or accidental deletion. The best solutions will offer the ability to create application-consistent backups of leading business applications. Look for a solution that creates fully-independent backup volumes that can be restored at the volume-level in the event of disaster.

The most effective approach to protecting data on your flash arrays for both the short and long term is to combine the near-instant, non-intrusive availability of snapshots with the reliable recovery and cost-effective retention of backups, delivered in an application-aware, flash-integrated, flat-backup solution.

Consideration #3

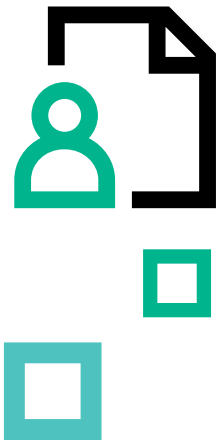
Meet performance objectives

The performance benefits of flash should extend to backup and recovery

Flash is all about enhanced SLAs. The expectation of performance shouldn't stop with your apps. Your flash solution should accelerate your backups and restores too, and it should minimize the impact of backups on your applications. Anything less and you'll fail to realize the full benefits of flash.

The demands of mobile applications and always-on availability are pushing you towards more aggressive data-protection SLAs. Flash-integrated flat backup should provide the technologies to meet the most demanding RPO and RTO requirements:

- Snapshot technology that creates application-consistent, Point-In-Time (PIT) backups, eliminating the need for backup windows
- Differential technology that ensures only changed blocks are sent to backup—a fraction of the data typically copied with traditional backup
- Deduplication technology that reduces your backup-storage requirement by 20 times on average, enabling more granularity while using fewer resources
- Express Protect copy technology that stores different snapshots as synthetic full backups, speeding application recovery

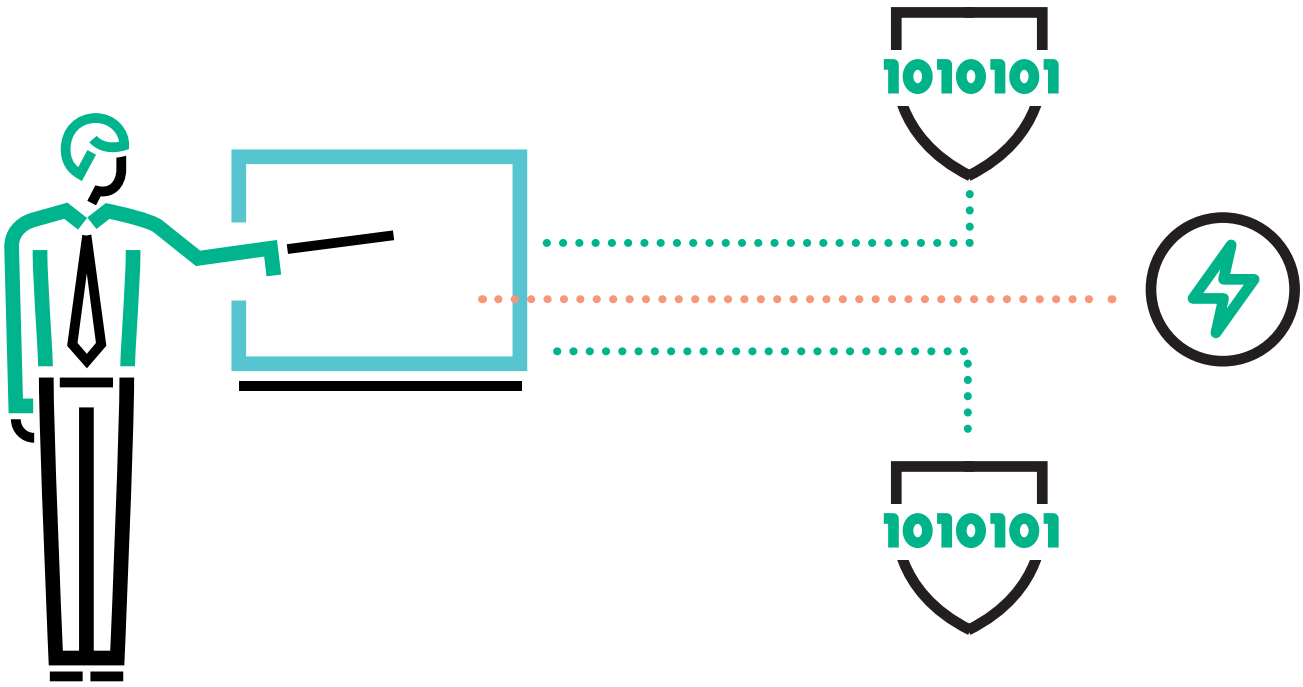


In a flat-backup solution, data bypasses your application and media servers and goes directly to your protection storage via a virtual machine. This reduces the impact of backup on your applications, which helps support the performance goals of your flash deployment. It also means that less bandwidth is needed to move the data, freeing capacity for your applications.

Integration with leading software solutions, including mainstream business-infrastructure applications and backup solutions, simplifies management and gives your application owners greater control.

Application recovery with flat backup is incredibly fast. Unlike traditional backup software that changes the format of the backed-up data, snapshot-based backups keep the disk-based format, dramatically changing the concept of recovery. Data simply needs to be moved from backup to primary storage where it can be mounted and used immediately, reducing RTOs to seconds or minutes. This applies equally to applications running in a physical environment or VMs.

Flash-integrated flat backup provides the **technologies** to meet the most demanding RPO and RTO requirements.



Consideration #4

Control costs

Backup and recovery solutions should be inexpensive, efficient, and simple to use

In the all-flash datacenter, capacity efficiency is the key to controlling storage costs. Deduplication and data-compaction technologies like thin provisioning and granular allocation increase efficiency. Techniques like adaptive sparing, system-wide striping, and write optimization balance loads across your storage arrays, preventing write hotspots and preserving your storage media. These capabilities reduce primary and backup-storage costs and should be basic table-stakes for your storage vendors.

Flat backup is incredibly fast; data simply needs to be moved from backup to **primary storage** where it can be used almost immediately, reducing RTOs to seconds or minutes.

If you have multiple, different, or incompatible backup hardware and applications across your enterprise, there's a high probability you're wasting capacity. A flash-integrated, flat-backup solution will reduce data-protection silos across the entire enterprise, while a consistent approach will reduce the costs of storing data copies. With its ability to move snapshots from primary to backup storage and create synthetic differential copies, a flat-backup solution makes more flash storage available for production data while reducing the amount of backup storage required for copies, further reducing costs.

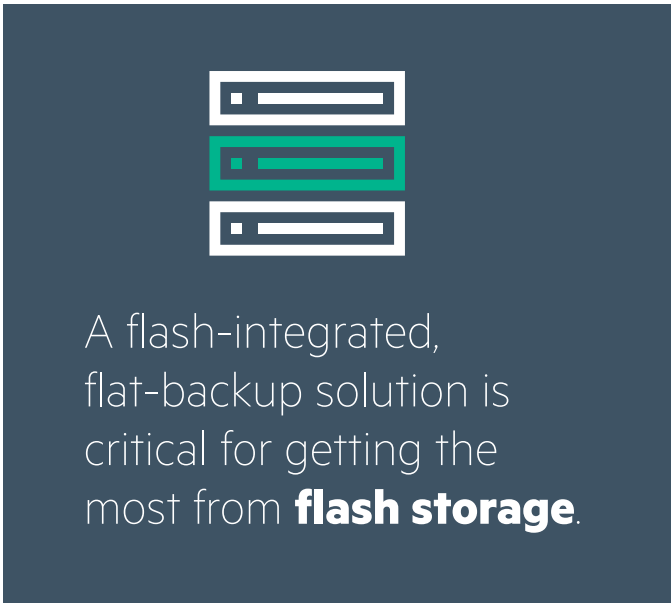
In a flat-backup solution, data bypasses your application and media servers and goes directly to your protection storage. Bypassing the media server and associated software also means greater simplicity and lower cost.

Management of your backup and restore processes should come from a single console, preferably your storage hypervisor. Backups and restores should be easy to set up and should run automatically, reducing operating costs and freeing up IT resources for more strategic activities.

The bottom line

Make the most of your investment

Your data-protection solution should offer a way to protect all of your primary data, retain it for the long term, and derive business value from it. A flash-integrated, flat-backup solution gives you the most from your migration to flash. The right solution will:



- ☑ Protect application uptime from the full spectrum of threats
- ☑ Provide global deduplication
- ☑ Shield applications from performance impact due to backups
- ☑ Support more frequent RPOs (including zero-data-loss RPOs)
- ☑ Accelerate recovery to meet shorter RTOs
- ☑ Simplify backup and recovery processes and data-copy management
- ☑ Maximize flash investments by boosting flash-capacity efficiency

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