# Innovations for greater efficiency

*IBM introduces flash and software-defined storage innovations that enable greater efficiency and productivity for 21st century business*

## Highlights

- Increase storage density and reliability with IBM enhanced 3D TLC NAND flash

- Help lower costs and capacity requirements without sacrificing performance with enhanced inline data compression from IBM

- Simplify data movement between on-premises and public cloud environments with IBM® Spectrum Virtualize™ for Public Cloud

- Transform and modernize IT infrastructure with new VersaStack converged infrastructure solutions

The worldwide enterprise data storage market is substantial, with the equipment segment alone generating around USD40 billion annually in sales revenue.[1] A market that size naturally generates intense competition. IBM is one of the leading storage vendors on the planet.[2] In order to remain a leader, IBM must constantly refresh its storage portfolio with innovations that bring recognized value to customers.

Recently, IBM announced a number of innovations to both systems and software designed to increase the efficiency and capabilities of IBM storage solutions. Major technology enhancements include:

- IBM® FlashSystem® family capacity and technology upgrades
- New software features for IBM Spectrum Virtualize, IBM FlashSystem A9000 and IBM FlashSystem A9000R
- New VersaStack converged infrastructure solutions

IBM storage solutions combine the maturity that can lower risk and inspire confidence with billions of dollars (US) of engineering innovation and investment every year that help customers capture and keep a competitive advantage.

## IBM FlashSystem 900

IBM FlashSystem 900 provides the foundational
IBM FlashCore® technology for every member of the
IBM FlashSystem family. The all-flash array and its precursors
have been deployed in mission-critical environments around the
world for 10 years. But the success and stability of the platform
has not slowed the pace of innovation.

Next-generation application workloads such as the Internet of
Things (IoT), machine learning, cognitive computing, real-time
analytics, personalization and security/fraud detection have
three common characteristics: They combine multiple data
sources, experience substantial and never-ending collection of
data, and demand immediate analysis. To address these next-
generation characteristics, storage must provide high input/
output per second (IOPS), consistent low latency, higher
capacities at lower cost and simplified management. The new
IBM FlashSystem 900 is designed to meet all of these
next-generation storage requirements.

## Higher capacity and value

Although IBM FlashSystem 900 is most often deployed to
accelerate business-critical applications, cost-efficiency has
nonetheless always been an important focus for these systems.
To increase storage density and lower costs, IBM FlashSystem
900 has transitioned to IBM enhanced 3D triple-level cell
(TLC) storage media based on Micron FortisFlash technology.
It provides three times greater flash density and storage
capacity than previous multi-level cell (MLC)-based
IBM FlashSystem 900 solutions. Now, enterprises can get up to
180TB of usable storage capacity in a platform only two rack
units tall. Thanks to increased media densities coupled with
native data compression, IBM FlashSystem 900 can provide
storage capacity at significantly lower cost per terabyte than
previous models.



IBM MicroLatency Module

Along with the move to 3D TLC flash media,
IBM FlashSystem 900 is also introducing a new, more
powerful native inline data compression technology at the
IBM MicroLatency® module level that provides more consis-
tent data reduction performance across an even wider range of
workloads. IBM is so confident in the performance of the new
data compression engine that the company provides an optional
effortless compression guarantee of 50 percent capacity savings
without collecting data and generating reports—no matter the
workload environment. When this new inline compression
function is combined with the move to 3D TLC flash, the cost
savings offered by the new IBM FlashSystem 900 can be
substantial.

## High performance with consistent low latency

The new IBM FlashSystem 900 offers greater value with 3D TLC flash and powerful data compression—and yet, for most workloads, delivers lower latency, thanks to the fact that inline compression reduces the amount of data traffic. This extraordinary achievement begins with hardware-accelerated IBM compression implemented entirely in the systems' field programmable gate arrays (FPGAs). Next, the compression work is distributed internally across all the FPGAs in every MicroLatency module, substantially reducing performance bottlenecks. Finally, due to the effectiveness of the compression algorithm, latency and performance can actually improve in many cases because of reduced I/O traffic. Thanks to these enhancements, plus the quality of the underlying 3D TLC technology, IBM FlashSystem provides latency as low as 105 microseconds, up to 1,200,000 IOPS in a single array and significant flash endurance for a seven-year flash wear guarantee.[3]

## Simplified management

System management has also seen significant enhancements, beginning with the introduction of a new IBM FlashSystem 900 user interface (UI). The UI has an improved overview dashboard that provides all information in an easy-to-consume format and allows visualization of effective capacity. Along with the IBM Comprestimator tool, which estimates data compression rates for targeted workloads, the new UI enables easier storage planning and management. Also, the system includes improved integration with IBM Security Key Lifecycle Manager (SKLM) to simplify and enhance data security.

Thanks to all these improvements, IBM FlashSystem 900 continues to set industry standards for high performance, ultra-low latency, extreme reliability, ease of management and on-going levels of innovation expected from all-flash storage for business-critical workloads.

## IBM FlashSystem A9000 and IBM FlashSystem A9000R

Because IBM FlashSystem 900 provides the flash storage foundation for the other platforms, enhancements to this system translate to increased scale, density and economic benefits across the entire IBM FlashSystem family.

IBM FlashSystem A9000 and IBM FlashSystem A9000R are built for the cloud, with their IBM Spectrum Accelerate™ enterprise-grade software stack and grid architecture. For IBM FlashSystem A9000R, the three times greater density means that capacity can scale to 3.6 petabytes (PB) and performance to 2.4 million IOPS per system. For IBM FlashSystem A9000, higher storage density and capacity enables the systems to reach 900 TB of effective capacity in an 8U solution when deployed with the 18 TB MicroLatency modules. And thanks to a wide range of storage services, both platforms can be tailored to address a variety of business use cases, including virtual desktop infrastructure (VDI), hybrid cloud and mixed workloads.

Additionally, leveraging new capabilities in IBM HyperScale Mobility, IBM FlashSystem A9000 and IBM FlashSystem A9000R now provide enhanced interoperability with IBM XIV® Gen3 storage arrays, simplifying the integration of IBM FlashSystem A9000 and IBM FlashSystem A9000R arrays into existing XIV Gen3 environments. Using asynchronous mirroring, enterprises can leverage their legacy XIV Gen3 storage to build lower cost data protection, unstructured data, object storage and disaster recovery solutions deeply integrated with the high performance IBM FlashSystem arrays.

## IBM FlashSystem V9000

IBM FlashSystem V9000 combines IBM Spectrum Virtualize software with the ultra-low latency, high density, and extreme reliability of IBM FlashCore technology. IBM FlashSystem V9000 benefits from all the advantages provided by the move to IBM enhanced 3D TLC. The systems also offer many new scale-up and scale-out options. Additional IBM FlashSystem V9000 arrays can be integrated into high-performance scale-out solutions providing more than five million IOPS. Scale-up options involve adding IBM FlashCore storage nodes as well as 2U and 5U SAS enclosures that supply up to 6.7 PB of capacity each.

IBM FlashSystem V9000

To lower risks and help reduce costs even further, IBM FlashSystem V9000 and other members of the IBM Storage portfolio now offer three new customer support and product upgrade programs:

- **IBM Data Reduction Guarantee**: Reduces planning risks and helps lower storage costs by guaranteeing baseline levels of data compression effectiveness in IBM Spectrum Virtualize-based offerings.
- **IBM Controller Upgrade Program:** Enables customers of designated all-flash IBM storage systems to reduce costs while maintaining leading-edge controller technology for essentially the cost of ongoing system maintenance.
- **IBM High-Availability Guarantee:** Helps enterprises avoid the costs and risks related to business downtime by ensuring the availability of business-critical data and storage systems.

## IBM Spectrum Virtualize v8.1.1

IBM FlashSystem V9000, IBM Storwize® family of data storage systems, VersaStack converged infrastructure solutions and IBM SAN Volume Controller (SVC) all benefit from innovations and enhancements recently implemented in IBM Spectrum Virtualize version 8.1.1., including:

- New support for Docker and Kubernetes container environments, enabling enterprises to deploy applications using this lightweight, agile technology backed with IBM storage
- Plans to add cognitive support services to the IBM cloud-based storage management platform, IBM Spectrum Control™ Storage Insights. The new cognitive support is designed to dramatically increase the volume of diagnostic data collected and to use the latest IBM technologies to increase insight into storage health, performance and capacity. It is designed to provide faster resolution of issues, an enhanced user experience, higher system availability and even greater confidence in the services delivered from one of the world's leading cloud environments.

These enhancements are available for IBM Spectrum Virtualize and IBM Spectrum Accelerate-based solutions.

New IBM Spectrum Virtualize for Public Cloud is now available, enabling real-time disaster recovery and data replication and migration between on-premises storage and public cloud resources. Enterprises with IBM SAN Volume Controller (SVC), Storwize family, IBM FlashSystem V9000 and VersaStack solutions—plus any of the more than 400 heterogeneous storage systems supported when virtualized by these platforms—can take advantage of this capability. Implementing IBM Spectrum Virtualize for Public Cloud is straightforward: customers purchase public cloud server and storage resources from IBM Cloud, then license IBM Spectrum Virtualize for Public Cloud to extend its rich set of storage services and features across the acquired cloud resources. An advantageous utility-based licensing model is available to complement IBM Cloud pricing for servers and storage.

## VersaStack solutions

VersaStack converged infrastructure solutions combine Cisco Unified Computing System elements with IBM software-defined storage to address specific business use cases, data center requirements and application workloads. These solutions take advantage of all the innovations introduced into IBM storage systems, multiplying their capabilities and value. There are now more than 20 Cisco Validated Designs for VersaStack solutions, including VersaStack for VDI, VersaStack for IT Modernization, VersaStack for remote and branch offices, and leading-edge Converged Object Storage solutions.

## IBM Storage Utility Offering

IT industry analyst IDC predicts that pay-as-you-use models will account for as much as 50 percent of on- and off-premises physical IT and data center asset spending in 2018.[4] IBM is responding with the new Storage Utility Offering, which provides the service model and economics of cloud with the assurance and security of on-premises infrastructure.

The Storage Utility Offering gives enterprises the ability to pay for storage capacity based on actual monthly usage. It is designed to provide instant access to new capacity to address requirement spikes and unpredictable rates of data growth. It's ideal for businesses that want to avoid lengthy procurement processes each time they need more capacity and don't want to overbuy due to seasonal capacity spikes.

IBM analysis indicates that this new offering can lower costs in the short term and over longer periods as well. You pay for what you use, when you use it, which means your monthly costs can flex efficiently up and down. And the powerful management capabilities of IBM Storage Insights provide greater predictability and better planning for the future. Currently, the offering is available with IBM FlashSystem A9000, IBM FlashSystem A9000R, IBM FlashSystem 900, Storwize V7000F and Storwize V5030F solutions.

## Why IBM?

IBM maintains one of the world's largest and most influential corporate research capabilities, with more than 3,000 researchers in 12 labs located across six continents. IBM produces an industry-leading number of breakthroughs, averaging more than 22 patents per day in 2016. Sustained by this pace of innovation, IBM has topped the list of annual U.S. patent recipients for 24 consecutive years, with 8,088 new patents in 2016 alone.[5]

Innovation is the IBM competitive advantage. As with all other product lines within the company, the IBM Storage portfolio benefits from a culture based on research and development. IBM customers have come to expect—and continue to benefit from—the constant stream of enhancements and improvements that keep

## For more information

To learn more about innovative IBM Storage solutions, contact your IBM representative or IBM Business Partner, or visit: **ibm.com**/storage/flash

Additionally, IBM Global Financing provides numerous payment options to help you acquire the technology you need to grow your business. We provide full lifecycle management of IT products and services, from acquisition to disposition. For more information, visit: **ibm.com**/financing

[1] "Enterprise Storage Market Flattens in Flashy Q1," *EnterpriseStorageForum.com*, June 2017. http://www.enterprisestorageforum.com/storage-hardware/ enterprise-storage-market-flattens-in-flashy-q1.html

[2] "IBM Ranked # 1 in Worldwide Software-Defined Storage Software Market," IBM, April 2017. http://www-03.ibm.com/press/us/en/ pressrelease/52189.wss

[3] Details of the guarantee will be provided by your IBM representative at time of purchase

[4] "IDC Futurescape #3: Worldwide Datacenter 2017 Predictions," *IDC*, 2016. #US41870916

[5] "About Us," *IBM Research*. http://www.research.ibm.com/about/

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