IBM FlashSystem V9000

Gain the advantages of software-defined storage at the speed of flash

Highlights

- Harness the advantages of software-defined storage at the speed of flash
- Deploy storage services to transform and modernise existing systems
- Accelerate active data sets with the high performance and extreme reliability of IBM® FlashCore technology
- Help lower costs and increase storage density with 3D triple-level cell (3D TLC) flash and compression
- Easily scale capacity and performance to many petabytes (PB) and millions of input/output operations per second (IOPS)
- Leverage a single platform to build hybrid cloud, object storage and many other storage solutions.

The competitive landscape of the 21st century demands agility, efficiency and performance. Business lines such as yours must change direction essentially overnight – or get left behind. You must gain every insight possible from all available data assets, or lose competitive advantage. You look to your information technology to help you move quickly, lower costs, respond more rapidly than competitors and seize new opportunities. These modern, hyper-competitive, high-performance environments are where IBM FlashSystem V9000 thrives:

- Need to do more with less? The new all-flash storage systems leverage the multiple cost advantages of IBM enhanced 3D TLC NAND flash and compression technology – without sacrificing performance
- Need the agility to address all your application workloads with one solution, then add new workloads – unstructured data from the Internet of Things (IoT), real-time analytics, cloud resources or cognitive systems – without performance or scalability restrictions? IBM FlashSystem V9000 combines microsecond (µs) flash latency with leading-edge IBM software-defined storage technologies to enable capacity and performance scale-up and/or scale-out to many petabytes and millions of IOPS
- Need to modernise your data centre (DC) without forklifting out existing systems and wasting substantial investments? The IBM Spectrum Virtualize capabilities of IBM FlashSystem V9000 enable you to virtualise more than 400 heterogeneous external storage systems into one integrated resource and extend a rich set of features and functionality to all. You gain ongoing value from existing systems while simply and non-disruptively modernising your IT infrastructure.

This is 21st-century data-storage innovation at its best. This is IBM FlashSystem V9000.

Performance and efficiency at the core

IBM FlashCore technology provides the high-performance, extremely efficient storage foundation for IBM FlashSystem V9000. IBM FlashCore technology refers to the IBM innovations that enable IBM FlashSystem solutions to deliver consistent µs latency, extreme reliability and a wide range of operational and cost efficiencies. IBM FlashCore innovations include a hardware-accelerated non-volatile memory (NVM) architecture and advanced flash management features such as IBM Variable Stripe Redundant Array of Independent Disks (RAID) technology; IBM-engineered error correction codes; and proprietary garbage collection algorithms that not only increase flash endurance, but also accelerate performance while reducing latency.

IBM FlashSystem V9000 leverages the advantages of IBM FlashCore-enhanced 3D TLC storage media that provides three times greater flash density and storage capacity than previous IBM FlashSystem solutions.[1] Along with the move to 3D TLC flash media, the purpose-engineered IBM MicroLatency modules at the heart of IBM FlashCore technology utilise powerful inline, hardware-accelerated data compression technology that provides more consistent data reduction performance across an even wider range of workloads.[1] The MicroLatency modules also support an off-load AES-256 encryption engine with IBM Security Key Lifecycle Manager centralised key management, high-speed internal interfaces and full hot-swap capabilities that enable organisations to achieve lower cost per capacity with even better data security and flash reliability than before.[1]

A full spectrum of advantages

IBM FlashSystem V9000 offers the advantages of IBM FlashCore technology deeply integrated with the software-defined capabilities of IBM Spectrum Virtualize. This means that along with ultra-low latency and multi-dimensional data protection at the storage media level, the systems also provide a wide range of storage services, including virtualisation, data migration, synchronous and asynchronous copy services, high-availability (HA) configurations, storage tiering and compression technologies.

IBM FlashSystem V9000 accelerates the full range of applications and infrastructures. It can function as a feature-rich, software-defined storage layer that virtualises and expands the capabilities of managed storage. This allows you to extend the value of your existing storage investments while consolidating them under one management console. Plus because the storage is virtualised, volumes can be non-disruptively moved between external and internal storage, enabling agile integration into existing storage environments and seamless data migration between IBM FlashSystem V9000 and legacy storage systems.

Powerful data efficiency and scalability

IBM FlashSystem V9000 provides hardware-accelerated inline data compression that reduces storage capacity requirements for many workloads with essentially no performance impacts. Complementary IBM Spectrum Virtualize technologies can increase data reduction and cost benefits even further, achieving 5:1 compression ratios and more with some data sets.

IBM FlashSystem V9000 also offers a very wide range of scale-up and scale-out options. Additional IBM FlashSystem V9000 arrays can be integrated into high-performance scale-out solutions offering more than five million IOPS. Scale-up options involve adding IBM Flash enclosures as well as 2U and 5U SAS drive enclosures that can supply up to 6.7 PB of capacity in Tier 0 storage configurations and up to 32 PB in Tier 1 configurations. With the IBM Easy Tier functionality of IBM Spectrum Virtualize, overall storage costs can be reduced further by automatically migrating hot data to Tier 0 – maximising the workload performance – while the majority of the data is stored on cost-efficient Tier 1 storage.

Simplified management

IBM FlashSystem V9000 introduces a new user interface (UI) with the same look and feel as other IBM FlashSystem solutions, for a consistent management experience across all platforms. The UI has an improved overview dashboard that provides all information in an easy-to-consume format and allows visualisation of effective capacity. Along with the IBM Comprestimator tool, which estimates data compression rates for targeted workloads, the new UI enables much easier storage planning and management.

IBM FlashSystem V9000 features key enhancements to the existing IBM Electronic Customer Support (ECS) services. The enhanced ECS remote support assistance allows remote interaction with IBM support technicians. These operatives can perform secure, non-disruptive diagnostics, software updates, troubleshooting and – in many cases – problem resolution. Plus, the data collected from deployed systems can help drive product enhancements and future innovation. This powerful new capability can help lower costs, increase system availability and streamline maintenance and updates for thousands of enterprises around the planet.

Agile integration

Once you deploy an IBM FlashSystem V9000 solution, IBM Spectrum Virtualize technology enables simplified access to the entire IBM Spectrum Storage family of leading-edge software-defined storage solutions. IBM Spectrum Storage solutions allow you to build hybrid cloud architectures, increase system efficiency with copy data management, implement comprehensive data protection and disaster-recovery (DR) solutions, leverage the advantages of cloud-based object storage and much more. IBM FlashSystem V9000 integrates well with leading host-side virtualisation and container platforms such as IBM PowerVM, Microsoft Hyper-V, VMware, Kubernetes and Docker. The systems support VMware vStorage application programming interfaces (APIs) for Array Integration (VAAI) and VMware vSphere APIs for Storage Awareness (VASA), as well as VMware Virtual Volumes (VVols). This agile integration with virtualisation technologies can enable enterprises of all sizes and types to derive greater value at lower cost from their information assets.

Containers are an open-source technology that lets software be packaged with everything it needs to run the same in any environment. Containers offer the versatility of virtual machines (VMs), but at a much smaller footprint and cost. As a result, containerisation is a key enabling technology for flexibly delivering workloads to private and public cloud and DevOps. Using the IBM Storage container plug-in framework, IBM FlashSystem V9000 enables any supported storage to be used as persistent storage in Docker and Kubernetes container environments, improving flexibility, simplifying deployment and helping to lower costs while offering clients the confidence of deploying stateful containers using highly available storage with enterprise capabilities.

IBM FlashSystem V9000 provides a single platform to address the full spectrum of 21st-century data storage requirements. From all-flash performance and IBM FlashCore reliability, through easy integration and almost unlimited scalability, to virtualisation that can transform and modernise existing systems, IBM FlashSystem V9000 provides extraordinary value – and much more.

IBM FlashSystem V9000 at a glance		
Models	9846/9848 AC3 controllers 9846/9848 AE3 flash enclosure drawers	
System size	Minimum (1 x AE3 and 2 x AC3)	Maximum scaled-out system (8 x AE3 and 8 x AC3)
Flash type	IBM-enhanced 3D TLC	
Flash module configuration	For each AE3: 6, 8, 10 or 12 3.6 terabyte (TB) modules; or 8, 10 or 12 8.5 TB modules; or 8, 10 or 12 18 TB modules	Up to 8 AE3 expansions; up to 4 AC3 pairs
Maximum internal flash capacity	• 43 TB to 219 TB (effective, assuming 2.5:1 or better hardware compression) • 900 TB (effective, assuming 5:1 data reduction)	• Up to 1.7 PB (effective, assuming 2.5:1 or better hardware compression) • 6.7 PB (effective, assuming 5:1 data reduction)
Maximum external storage capacity	External virtualisation: Up to 32 PB usable capacity	
Maximum performance (100% read, cache miss)		
Minimum latency (4K)	180 µs	180 µs
IOPS (4K) with h/w compression	1,300,000	5,200,000
Bandwidth (256K)	10 GB/s	80 GB/s

IBM FlashSystem V9000 at a glance		
reliability, availability, serviceability (RAS) features	Two-dimensional flash RAID • Module-level Variable Stripe RAID • System-level RAID 5 across modules Hot-swappable flash modules Tool-less module installation/replacement Concurrent code load Redundant and hot-swappable components	
Encryption	Data-at-rest AES-XTS 256	
Host connectivity options per building block	16 x 16/8/4 gigabit (Gb) Fibre Channel (FC) 8 x 10 Gb Fibre Channel over Ethernet (FCoE) 8 x 10 Gb Internet small computer system interface (iSCSI)	64 x 16/8/4 Gb FC 32 x 10 Gb FCoE 32 x 10 Gb iSCSI
Virtualisation software model	5639-RB8	
Tiered solution models	9846/9848 12F, 24F and 92F serial attached SCSI (SAS) expansion drawers, with each drawer adding up to a further 1.3 PB of storage	
Controller CPU	Four Intel Xeon E5 v4 Series 8-core 3.2 gigahertz (GHz) processors	16 Intel Xeon E5 v4 Series 8-core 3.2 GHz processors
Controller memory	128 GB standard, up to 512 GB	512 GB standard, up to 2,048 GB
Dimensions (height x width x depth)	6U in a standard 19 in. rack 288 mm x 445 mm x 801 mm	4 x 6U blocks in a standard 19 in. rack 1,066 mm x 445 mm x 801 mm Additional AE2 units add 2U or 44.5 mm in height
Weight	82 kg (181 lb) fully loaded	Up to 736 kg (1623 lb) fully loaded

Why IBM?

Building on decades of storage leadership, IBM offers a comprehensive portfolio of integrated, flash-optimised storage solutions that can propel organisations into the next era of IT. These proven, easily integrated flash solutions accelerate critical applications for faster decision making, come with best-in-class reliability and deliver new efficiencies across the entire business environment for a faster return on investment (ROI). IBM flash storage solutions can provide enterprises with the application performance they need to compete, innovate and grow.

For more information

To learn more about IBM FlashSystem V9000, please contact your IBM representative or IBM Business Partner (BP), or visit: **ibm.com**/us-en/marketplace/flash-storage-virtualization

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

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[1] IBM internal measurements.

IBM Spectrum Virtualize

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