IBM FlashSystem Family

Platinum Business Partner

IBM FlashSystem family

High-performance, highly functional solutions that make hybrid cloud storage simple for every enterprise

Highlights

- Deploy IBM FlashSystem storage to address the full range of workloads
- Improve your business agility with enterprise-class storage capability
- Complement on-premises storage of all types with hybrid cloud capability
- Leverage AI to optimize configurations and streamline issue resolution
- Transform the economics of data storage using data reduction technologies
- Deploy leading-edge storage solutions with confidence using IBM FlashWatch
- Increase cost-efficiency with IBM Storage Utility programs
- Optimize tiered storage—including flash storage—with IBM Easy Tier

These days, to achieve acceptable levels of insight and accuracy, analytics and AI applications are consuming enormous amounts of data. Managing, moving, and storing large data volumes with great efficiency and enough performance to derive maximum value from data assets requires a modern IT infrastructure with wide-ranging capabilities – from intelligent system optimization and powerful data reduction, through comprehensive security and encryption features, to hybrid cloud capabilities and ultralow-latency storage.

The IBM FlashSystem family of data management solutions is designed to meet all of these enterprise storage needs while reducing costs and complexity. In fact, the IBM FlashSystem family offers the lowest cost and highest performing storage options on the market today.1 All family members combine the performance of flash and a Non-Volatile Memory Express (NVMe)-optimized architecture with the reliability and innovation of IBM FlashCore technology and the rich feature set and high availability of IBM Spectrum Virtualize.

High-performance family

Over the years, the IBM FlashSystem platform has evolved and adapted to changing requirements – better flash management and durability, hardware-driven data reduction and encryption, a transformation of the basic FlashCore form factor, new hybrid cloud capabilities, and incorporation of NVMe, among many other changes. But one characteristic has remained the same – ultra-low storage latency and blazing system performance.

The IBM FlashSystem family currently consists of models designed to address the full range of application workload and cost requirements. Every solution comes with the intelligence and capabilities needed to make deployment and management of hybrid cloud architectures simple for any enterprise:

- IBM FlashSystem 5000 solutions offer entry-level cost-efficiency within the traditional 2 rack unit family architecture.
- New IBM FlashSystem 5200 offers a very efficient end-to-end NVMe or hybrid flash 1U option with all the performance and functionality of larger arrays.
- IBM FlashSystem 7200 provides the combination of performance, features, and cost-efficiency that make it a favorite of budget-constrained enterprises with mid-range workloads.
- Top-of-the-line IBM FlashSystem 9200 is engineered to tackle the most demanding business and research environments.
- Based on IBM FlashSystem 9200, IBM FlashSystem 9200R is designed for clients needing an IBM built, IBM tested complete storage system delivered assembled, with installation and configuration completed by IBM, delivering ultra-high throughput and NVMe-optimized flash performance.

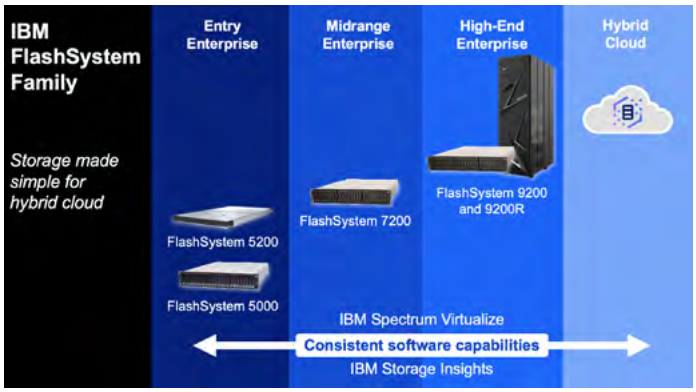
IBM FlashSystem storage solutions are:

- NVMe-accelerated flash arrays with control enclosures that are 100 percent end-to-end NVMeenabled and Storage Class Memory (SCM)-capable.[2] The systems offer industry-leading performance and scalability with support for bare-metal, virtual, and containerized environments.
- IBM Spectrum Virtualize-driven, with a full range of industry-leading data services such as dynamic tiering, IBM FlashCopy, data mobility, and high-performance data encryption, among many other data management features
- Hybrid cloud ready, with support for private, hybrid, or public cloud deployments. The solutions come with ready-to-use, proven, validated "cloud blueprints" with support for cloud API automation and secondary data orchestration software.
- Cost-efficient, with innovative Data Reduction Pool (DRP) technology that includes deduplication and hardware-accelerated compression technology,[2] plus SCSI UNMAP support and all the thin provisioning, copy management, and efficiency you'd expect from IBM Spectrum Virtualize-based storage
- Hybrid storage enabled, with multiple expansion enclosure options based on 12 Gb/s SAS that supports both solid state drives (SSD) and hard disk drives (HDD)3
- Artificial intelligence (AI)-enhanced through the IBM Storage Insights analytics, resource management, and support platform. Plus, IBM Spectrum Virtualize functionality includes AIbased data placement for optimal data center performance and zero-downtime data migration.

IBM FlashSystem storage provides enterprise-grade system availability and data-security features that include non-disruptive data migration and remote mirroring using IBM HyperSwap technology, plus "six nines" availability, hardware-accelerated data-at-rest encryption, and an IBM distributed RAID technology that can reduce disk rebuild times substantially compared to traditional RAID solutions. The systems leverage the cost advantages of multiple flash drive options and feature an intuitive user interface, synchronous/asynchronous replication, and more than 600 application programming interfaces (APIs). Plus, IBM FlashSystem provides affordable, non-disruptive upgrade paths that deliver increased performance, scalability, and functionality.

Simplified management

IBM FlashSystem based on a common storage software platform with IBM Spectrum Virtualize is designed to simplify the full spectrum of modern business environments including virtual, container and hybrid cloud storage environments from the very start. The systems utilize a modern user interface for centralized management. With this single interface, administrators can perform configuration, management, and service tasks in a consistent manner over multiple storage systems – even from different vendors – vastly simplifying management and helping reduce the risk of errors. Plug-ins to support Microsoft System Center Operations Manager and VMware vCenter help enable more efficient, consolidated management in these environments. The interface is consistent with other members of the IBM Spectrum Storage family, to simplify tasks for administrators and help reduce the risk of error.



Powerful to the core

IBM FlashSystem solutions are designed to deliver flexible, cost-efficiency, scalability and performance. They feature support for NVMe over Fabrics for the highest end-to-end system performance. The solutions can utilize IBM FlashCore-enhanced storage media that provides extraordinary flash density and storage capacity, while achieving latency as low as 70 microseconds[4]. Purpose-engineered FlashCore Modules (FCM) utilize powerful inline, hardwareaccelerated compression technology that provides consistent data compression without performance impact across the full range of workloads. The FCMs are designed to support FIPS 140-2 Level 1 encryption with IBM Security Key Lifecycle Manager centralized key management and full hot-swap capabilities.

You can choose FCMs in multiple capacities or you can opt for industry standard NVMe or new SCM drives, with the capability to support all three drive types simultaneously within a single allflash array. This means that using the always-on inline high-performance data compression in the FCMs or DRP technology with the industry-standard drives, effective capacities can range into the multiple petabyte range in a single enclosure, with the ability to cluster, scale out, or scale up capacity and performance to many petabytes and millions of input/output operations per second (IOPS).

IBM FlashSystem control enclosures leverage the latest Intel processors, with more than a terabyte of memory cache available in some models. Each controller contains a hardware compression accelerator based on Intel QuickAssist technology with an available second accelerator. IBM FlashSystem arrays can be clustered and operated as a single system, with 12G, 24G, and 92G SAS expansion enclosures available that can support hundreds of SAS SSDs and/or HDD in hybrid storage configurations.

AI-powered storage visibility, insight, and control

IBM Storage Insights and Storage Insights Pro provide critical system analysis and optimization capabilities that enhance your IBM FlashSystem experience, such as:

- A single dashboard so you can see the status of all your block storage at a glance
- System information gathered from approximately 23 million data points so you can make more informed storage system decisions
- AI-enhanced analytics that leverage knowledge from over two exabytes of storage under management to better predict and help prevent problems before they impact your business
- When support is needed, the ability to easily open a ticket, upload log information, and view open tickets
- Detailed configuration data available to IBM specialists to help close tickets quickly.

Delivered as a service from IBM Cloud at no charge, Storage Insights is quick and easy to set up and requires no ongoing software maintenance. IBM Storage Insights Pro is an upgrade that provides more detailed information and additional capabilities.

Multi-dimensional data resilience

IBM FlashSystem family storage solutions can serve as the foundation of a flexible, highperformance, cost-efficient business resilience approach. The storage arrays offer many data protection and high-availability features through their use of IBM FlashCore technologies – from leading-edge flash management to complete component redundancy – but the real key to building powerful cyber resilience solutions stems from leveraging the wide-ranging capabilities of the IBM Spectrum Virtualize software that provides the data services for every IBM FlashSystem storage solution. The industry-leading capabilities of IBM Spectrum Virtualize include automated data movement, synchronous and asynchronous copy services (either onpremises or to the public cloud), encryption, high-availability configurations, AI-enhanced IBM Easy Tier® storage tiering, and data reduction technologies, among many others. IBM Spectrum Virtualize enables you to extend a broad spectrum of data services and functionality to over 500 IBM and non-IBM external heterogeneous storage systems, reducing both capital and operational costs while increasing the return on investments in legacy infrastructure.

IBM Spectrum Virtualize utilizes a technology called IBM FlashCopy to create local spaceefficient, point-in-time data copies. FlashCopy can be used to take rapid copies of production data for use as backups or for application development and testing activities, among others. Importantly, FlashCopy makes "consistent" data copies identical to production data sets at the instant they are created. Consistent copies are used to replicate data sets to backup and recovery solutions physically located away from the production environment.

To achieve recovery time objectives (RPO) approaching zero, where almost no data is lost during system recovery, two IBM FlashSystem solutions can be configured leveraging the capabilities of IBM Spectrum Virtualize and copies made by IBM FlashCopy in a Metro Mirror connection over two sites to synchronously replicate data across metro-area-wide distances. In this configuration, any write to a local Metro Mirror IBM FlashSystem target sends its data to the remote IBM FlashSystem target before the input/output (I/O) operation is acknowledged at the issuing host.

To build effective business resilience and disaster recovery (DR) architectures at greater distances, enterprises can configure multiple IBM FlashSystem solutions in a Global Mirror connection at essentially any distance apart, then asynchronously replicate data across regions.

Data is written to the local Global Mirror FlashSystem and the I/O is completed on the local system before that data is sent to the remote system. This approach can achieve very low Recovery Time Objectives (RTO) while still maintaining cost-efficient and acceptable RPOs. Global Mirror offers a number of benefits and advantages. For example, the Changed Volumes (CV) functionality within Global Mirror uses FlashCopy to guarantee the consistency of data copies, and also allows the option to "tune" RPO to meet budget and performance priorities. Global Mirror with CVs also offers advantages when bandwidth is an issue.

The IBM HyperSwap® function supports storage and servers in three data centers. In this configuration, IBM FlashSystem solutions enable servers at each data center to access data concurrently with automated switch-over in case of failure. When combined with server data mobility functions such as VMware vMotion or IBM PowerVM® Live Partition Mobility, HyperSwap technology enables non-disruptive storage and virtual machine mobility between data centers that can be up to 300 km (186 miles) apart.

Data reduction for enhanced efficiency

IBM DRP technology helps transform the economics of data storage. When applied to new or existing storage, DRP functionality can significantly increase usable capacity while maintaining consistent application performance. This can help eliminate or substantially reduce costs for storage acquisition, rack space, power, and cooling, while extending the useful life of existing storage assets. The DRP capabilities within IBM FlashSystem solutions include:

- Block deduplication that works across all the storage in a data reduction pool to minimize the number of identical blocks
- Compression technology that provides consistent performance across application workload patterns
- SCSI UNMAP support that de-allocates physical storage when operating systems delete logical storage constructs such as files in a file system.

Hybrid cloud, virtualized and container environments

The challenge for organizations these days is how to take advantage of hybrid cloud technology without the expense of replacing current storage with cloud-capable storage systems. The IBM Spectrum Virtualize functionality in all IBM FlashSystem solutions enables the use of cloud storage for disaster recovery, dramatically speeds deployment of hybrid cloud configurations, and helps slash storage costs.

To help drive IT transformation, IBM Spectrum Virtualize for IBM Public Cloud offers multiple ways to create hybrid cloud solutions between on-premises private clouds and the public cloud. It enables real-time storage-based data replication and disaster recovery, as well as data migration between local storage and IBM Cloud™. And because of its software-defined storage nature, IBM Spectrum Virtualize allows storage administration at a cloud service provider's site in the same way as on-premises, regardless of the type of storage.

The IBM Spectrum Virtualize functionality also complements server virtualization technologies such as PowerVM, Microsoft Hyper-V, VMware vSphere, Kubernetes, and Docker. Similar to provisioning virtualized servers, provisioning capacity with IBM FlashSystem is designed to become an almost entirely automated function.

Containers are an open-source technology that wraps applications with everything needed to run in any environment. Containerization is a key enabling technology for flexibly delivering workloads to private and public cloud and DevOps. IBM FlashSystem family supports Red Hat OpenShift and Kubernetes container environments, accelerating the deployment of persistent volumes with the IBM block storage CSI driver, certified by Red Hat and IBM.

[1] Silverton Consulting: IBM FlashSystem Storage and SAN Volume Controller Engine Updates, February 2020

[2] These capabilities are available starting on FlashSystem 5200

[3] FlashSystem 9200 and 9200R are all-flash only

[4] Performance based on IBM measurements; data might variate