

## IBM FlashSystem 5200

### Bringing NVMe-accelerated storage performance and new levels of cost-efficiency to smaller deployments in enterprises of all sizes

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#### Highlights

- Storage made simple for all
  - IBM FlashSystem 5200 to affordably accelerates your workloads in only 1U
  - Leverages the power of IBM Spectrum Virtualize for rich data services
  - Benefit from hybrid cloud storage capabilities to increase business agility
  - Extend wide-ranging data services across hundreds of external systems
  - Rely on powerful AI-enhanced tools to optimize storage operations
  - Ultimate data resilience and business continuance
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Startup companies, entry-level enterprises, remote offices, and network edge locations – these are the most common business environments around the world, by far. They may not have thousands of employees, but they are still adopting the same technologies as their larger competitors – hybrid cloud architectures, real-time analytics, artificial intelligence (AI), and blockchain, among many others. And they still require IT infrastructure that provides great flexibility and scalability, wide-ranging data services, seamless movement within cloud architectures, and perhaps most importantly – Speed.

For enterprises more sensitive to affordability, it is especially important to be able to start with small capital investments and add capabilities and components as their business and IT requirements grow.

These are the types of organizations that turn to IBM FlashSystem 5200. This compact new member of the IBM FlashSystem family of leading-edge storage systems offers the same levels of functionality as other family members – but in an efficient smaller form factor that enables enterprises to start with a very modest initial storage investment without sacrificing performance and then easily expand capacity and capabilities as needs grow and change.



### IBM FlashSystem 5200

## A family of cost-efficient, high-performance storage solutions

The IBM FlashSystem family has evolved and adapted to changing requirements – single platform approach, better flash management and durability, hardware-driven data reduction and encryption, FlashCore technology innovation, new hybrid cloud capabilities, and incorporation of NVMe, among many other changes. The major improvements have been towards simplicity, cost-efficiency, density, and blazing fast performance.

IBM FlashSystem storage solutions are:

- Starting on FlashSystem 5200 the family is NVMe-accelerated with control enclosures that are end-to-end NVMe-enabled, with flexibility to choose and mix between FlashCore Modules, industry standard NVMe drives and storage-class memory. The systems offer industry-leading performance and scalability with support for bare-metal, virtual, and containerized environments.
- Built with IBM Spectrum Virtualize, which delivers a full range of industry-leading data services such as dynamic tiering, IBM FlashCopy management, data mobility, and high-performance data encryption, among many other data management features
- Ready for hybrid cloud, with support for private, hybrid, or public cloud deployments. The solutions come with ready-to-use, proven, validated “cloud blueprints”.
- IBM Storage support for Ansible® -- the Red Hat® open source IT configuration management and automation platform continue to be enhanced including automation for HyperSwap for high availability configurations for mission-critical workloads.
- Cost-efficient, with innovative data reduction pool (DRP) technology that includes deduplication and hardware-accelerated compression technology<sup>1</sup>, plus SCSI UNMAP support and all the thin provisioning, copy management, and efficiency you’d expect from IBM Spectrum Virtualize-based storage
- Supporting hybrid storage, with multiple expansion enclosure options based on 12 Gb/s SAS that support both solid state drives (SSD) and hard disk drives (HDD)<sup>2</sup>

- AI-enhanced through the IBM Storage Insights analytics, resource management, and support platform. Plus, IBM Spectrum Virtualize functionality includes AI-based data placement for optimal data center performance and zero-downtime data migration.

The new IBM FlashSystem 5200 is the most compact storage system ever produced by IBM. It is designed to accelerate a wide range of enterprise deployments with bare metal, virtualized, or containerized servers. Leveraging IBM Spectrum Virtualize, IBM Storage Insights software, end-to-end NVMe protocols, these new systems bring the performance and functionality needed for almost any workload, delivering a lot more work using fewer drives and rack space than traditional SAS or even traditional flash systems, with as low as 70 microseconds latency<sup>3</sup>, as much as 1.7 petabytes of usable capacity in only one rack unit, HyperSwap high availability technology, 3-site replication, scalability and data reduction.

## Powerful to the core

FlashSystem 5200 brings all the simplicity and innovation of earlier family members, then adds an extremely important new capability – entry-level NVMe all-flash flexibility and affordability. The new IBM FlashSystem 5200 offers storage solutions that are simple enough for every environment; powerful enough for all environments.

It's time to revolutionize the entry-enterprise storage space. IBM FlashSystem 5200 introduces affordable end-to-end NVMe systems that allows enterprises of all sizes to start “small” and grow as their business requires in both performance and capacity. A single FlashSystem 5200 with only three NVMe FlashCore Modules, delivers the same throughput as a system with twenty-four SAS SSDs. And, like all IBM FlashSystem models, it also leverages IBM Spectrum Virtualize for data management and hybrid cloud functionality.

The basic system is comprised of an NVMe dual controller 1U control enclosure that can support up to 12 FlashCore Modules (FCM), industry standard SSDs, or storage-class memory drives. These drive technologies can be mixed in the same chassis and come in various sizes that provide up to 460TB of raw storage capacity and 1.7PB effective capacity within a single 1U system. Up to 512GB of controller cache is available with multiple 16/32 Gb FC, 12Gb SAS, or 10/25Gb Ethernet I/O adapters. IBM FlashSystem 5200 can support Fibre Channel (FC), NVMe-oF, iSCSI, and RoCE/iWARP RDMA protocols. The systems allow 4-way clustering for scale up to the multi-petabyte range, and the capability to connect up to 20 SAS expansion enclosures per system for nearly limitless scale out options.

IBM FlashSystem 5200 leverages the advantages of IBM FlashCore storage media that provides greater flash density and higher capacity than any industry-standard flash drives. Purpose-engineered FCMs utilize powerful inline, hardware-accelerated data compression and encryption technologies that provide consistent compression and encryption across the full range of workloads – with no performance penalties. IBM invented several technologies to make QLC perform and endure as well as TLC. FCMs use QLC combined with dynamic SLC allocation,

smart data placement (hotter read data placed on lowest latency pages) and read heat assessment. QLC enables a 38.4TB module (densest NVMe SSD in the industry). Additionally, FCMs provide Federal Information Processing Standard (FIPS) 140-2 Level 1 encryption with Gemalto SafeNet KeySecure or IBM Security Key Lifecycle Manager centralized key management and full hot-swap capabilities.

IBM FlashSystem 5200 can operate in distributed RAID (DRAID) 1, 5, or 6 modes. A key advantage is its ability to operate at full DRAID protection and efficiency with only three drives. This means that cost-sensitive users can start with a smaller capital expenditure and add capacity as needed. IBM DRAID 1 data can be read from all three drives, which provides a performance boost over traditional RAID 1 approaches, as well as allowing full recovery with loss of one drive. And assuming DRAID 1, the systems can achieve 1.5 million input/outputs per second (IOPS), under 70 microsecond latency, and 21 GB/s throughput.

## Award-winning capabilities

All IBM FlashSystem solutions leverage the proven capabilities of IBM Spectrum Virtualize software-defined storage (SDS) for data and storage management. IBM Spectrum Virtualize has been helping enterprises improve infrastructure flexibility and data economics for more than 15 years. It offers an industry-leading spectrum of features and functionality, including enhanced cloud functionality, comprehensive data reduction, and support for leading-edge container technologies that can provide enterprises with the capabilities they need to capture and keep competitive advantage across the full spectrum of modern business environments.

IBM Spectrum Virtualize delivers a full range of sophisticated storage functionality, including:

- IBM HyperSwap for non-disruptive application and data mobility between data centers
- Support for host-side virtualization solutions, including VMware virtual machines, Microsoft Hyper-V, and IBM PowerVM, among others
- Support for more than 500 external, heterogeneous storage systems from a wide variety of vendors
- Powerful DRP technology that includes deduplication, compression, and automated thin provisioning
- IBM Easy Tier AI-driven automated tiering functionality
- Software-based encryption that can be extended across all managed systems
- IBM FlashCopy and IBM Remote Mirror for local and remote three-site replication

IBM FlashSystem 5200 solutions can lower both capital expenditures and operational costs by extending a rich set of data services across existing heterogeneous external storage or by

adding SAS drive expansion enclosures, thanks to the extensive AI-enhanced storage resource management, predictive analytics, automated support, and data placement provided by IBM Spectrum Virtualize. Once under IBM Spectrum Virtualize management, data in external storage systems becomes part of the IBM FlashSystem solution and can be managed in the same way as internal drives. External systems inherit all the IBM Spectrum Virtualize functional richness and ease-of-use features incorporated into the IBM FlashSystem 5200 platform, including advanced replication, high-performance thin provisioning, encryption, compression, deduplication, and Easy Tier functionality that improve administrator productivity and boost storage utilization while also enhancing and extending the value of existing storage investments.

HyperSwap functionality enables a pair of IBM FlashSystem 5200 systems to support servers in multiple data centers. When combined with server data mobility functions such as VMware vMotion or IBM PowerVM Live Partition Mobility, HyperSwap enables nondisruptive storage and VM mobility between data centers up to 300 km (186 miles) apart. IBM Spectrum Virtualize three-site replication capability runs data copies at both metro and global distances to offer a variety of recovery point and time options.

## Cost-efficiency at the core

IBM FlashSystem 5200 is not only compact with low total cost of ownership (TCO), the high density of FCM drives and the data reduction options within IBM Spectrum Virtualize help transform the economics of data storage. When DRP is applied to new or existing storage, they can significantly increase usable capacity while maintaining consistent application performance. This can substantially reduce costs for storage acquisition, rack space, power, and cooling, while extending the useful life of existing storage assets. DRP capabilities include:

- Block deduplication that works across all the storage in a DRP 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

## Simplified management

IBM FlashSystem 5200 is designed to be easy to use from the very start. The innovative user interface enables administrators to 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.

IBM Storage Insights in the cloud and IBM Spectrum Control on premises provide organizations with an end-to-end view of storage health, long-term performance analytics and capacity statistics for IBM FlashSystem 5200 and the surrounding storage infrastructure.

## Data Resilience

IBM Spectrum Virtualize in FlashSystem storage solutions also provides enterprise-grade system availability and data security features that include nondisruptive 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, nondisruptive upgrade paths that deliver increased performance, scalability, and functionality.

As systems became linked with external networks, organizations adopted a “defense-in-depth” security mode so that if the perimeter was breached, there were additional layers of security to protect critical information. IBM FlashSystem 5200 provides advanced capabilities that can help maximize data protection, security and high availability to significantly reduce the risk of disruption and financial losses due to user errors, malicious destruction or ransomware attacks.

In addition, physical isolation layers can be created by storing sensitive copies in immutable storage, cloud environments or off-line write-once read many (WORM) tape devices to provide true “air-gap” protection. IBM FlashSystem provides modern data protection to efficiently prevent, detect and respond to cyberattacks.

## Greater storage visibility, insight, and control

Because data is the resource that drives your business, storage systems take on even greater importance. IBM Storage Insights and IBM Storage Insights Pro provide critical capabilities that enhance your experience with IBM Storage, including:

- A single dashboard so you can see the status of all your IBM block storage at a glance
- Trend information about capacity and performance so you can make better and more informed decisions
- Storage health information that helps you bring your configuration in line with best practices
- 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, AI-enhanced Storage Insights is quick and easy to set up and requires no ongoing software maintenance. Storage Insights Pro is an upgrade that provides more detailed information and additional capabilities. IBM Spectrum Control software provides similar capability for clients who prefer an on-premises solution.

## 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. IBM Spectrum Virtualize for Public Cloud functionality enables the replication of heterogeneous storage between on-premises data centers and IBM Cloud and Amazon Web Services (AWS). It provides the ability to use cloud capabilities for setting up a disaster-recovery target or for workload migration between on-premises and cloud-based resources. By leveraging IBM Spectrum Copy Data Management software, cloud storage may be used for data copies as well.

The IBM Spectrum Virtualize functionality in IBM FlashSystem 5200 complements server virtualization technologies such as PowerVM, Microsoft Hyper-V, and VMware vSphere.. Similar to provisioning virtualized servers, provisioning capacity with IBM FlashSystem 5200 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 5200 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.

## World-class support

IBM FlashSystem 5200 offers world-class customer support, product upgrade and guarantee programs:

- IBM Storage Expert Care service and support is simple. You can easily select the level of support and period that best fits your needs with predictable and upfront pricing that is a fixed percentage of the system cost.
- The IBM Data Reduction Guarantee helps reduce planning risks and lower storage costs with baseline levels of data compression effectiveness in IBM Spectrum Virtualize-based offerings.
- The 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.

- The 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.

<sup>1</sup>HW accelerated compression starts with FlashSystem 5200.

<sup>2</sup>IBM FlashSystem 9200 and 9200R are only all-flash models.

<sup>3</sup>Based on IBM internal analysis, February 2021. Actual performance results will vary.

## IBM Flashsystem 5200 at a glance

<b>Models</b>	IBM FlashSystem 5200
<b>Host interface</b>	10 Gbps Ethernet (iSCSI), 25/10 Gbps Ethernet (iSCSI, iSER - iWARP, RoCE) 16 Gbps Fibre Channel (FC, FC-NVMe), 32 Gbps Fibre Channel (FC, FC-NVMe)
<b>User interface</b>	IBM Spectrum Virtualize web GUI and CLI
<b>Supported drives</b>	2.5-inch NVMe FlashCore Modules (FCM): • 4.8 TB, 9.6 TB, 19.2 TB and 38.4 TB self-compressing FCM 2.5-inch NVMe flash drives - industry standard: • 800 GB, 1.92 TB, 3.84 TB, 7.68 TB and 15.36 TB Storage Class Memory (SCM): • 375 GB, 750 GB, 800 GB, 1.6 TB
<b>Max IOPs</b>	1.5M IOPs
<b>Min Latency</b>	Under 70µs
<b>Max Bandwidth</b>	21 GB/s
<b>RAID levels</b>	Distributed RAID 1, 5 and 6
<b>Maximum drives supported</b>	748 per control enclosure; 2,992 per clustered system IBM FlashSystem 5200 control enclosures support the following expansions: • Small form-factor enclosure: 24 x 2.5-inch drives • Large form-factor enclosure: 12 x 3.5-inch drives • High-density expansion enclosure: 92 x 3.5-inch drives
<b>Fans and power supplies</b>	Fully redundant, hot-swappable
<b>Rack support</b>	1U - 19-inch / 29" depth enclosure
<b>Cores per control enclosure/clustered system</b>	16/64
<b>Cache per control enclosure/clustered system</b>	64 or up to 512 GB/256 GB or up to 2.04 TB
<b>Management software</b>	IBM Spectrum Virtualize licensed machine code
<b>Advanced features included with each system</b>	<ul style="list-style-type: none"> <li>Virtualization of internal storage</li> <li>Data migration</li> <li>Data Reduction Pools with thin compression, deduplication, and thin provisioning</li> <li>UNMAP</li> <li>Remote mirroring</li> <li>Easy Tier</li> <li>FlashCopy</li> </ul>
<b>Additional available advanced features</b>	<ul style="list-style-type: none"> <li>External virtualization</li> <li>Encryption</li> <li>IBM Spectrum Control</li> <li>IBM Storage Insights Pro</li> </ul>
<b>Warranty</b>	<p>Hardware:</p> <ul style="list-style-type: none"> <li>1-year limited warranty</li> <li>Customer-replaceable units</li> <li>Limited on-site service</li> <li>Next business day between 9 a.m. and 5 p.m.</li> <li>Service upgrades available</li> <li>IBM Storage Expert Care</li> </ul> <p>Software:</p> <ul style="list-style-type: none"> <li>IBM Storage Expert Care</li> </ul>
<b>Replication services</b>	<ul style="list-style-type: none"> <li>FlashCopy</li> <li>Metro Mirror (synchronous) and Global Mirror (asynchronous)</li> </ul>
<b>Control enclosure dimensions</b>	<ul style="list-style-type: none"> <li>Height: 4.3 cm (1.7 in.)</li> <li>Width: 44.6 cm (17.5 in.) (19 in. rack standard)</li> <li>Depth: 77.0 cm (30.3 in.)</li> </ul>
<b>Control enclosure weight</b>	• Fully configured (12 drive modules installed): 19.5 kg (43.0 lb)
<b>Supported systems</b>	For a list of currently supported servers, operating systems, host bus adapters, clustering applications and SAN switches and directors, refer to the IBM System Storage Interoperation Center. <a href="https://www.ibm.com/systems/support/storage/ssic/interoperability.wss">https://www.ibm.com/systems/support/storage/ssic/interoperability.wss</a>
<b>Independent software vendor (ISV) solutions</b>	For a list of high-quality solutions with our partner ISVs, including access to solution briefs and white papers, refer to the ISV Solutions Resource Library. <a href="https://www.ibm.com/partnerworld/wps/pub/systems/whyibm/programs">https://www.ibm.com/partnerworld/wps/pub/systems/whyibm/programs</a>

Performance numbers are based on IBM internal analysis, February 2021. Actual performance results will vary.

## Why IBM?

The FlashSystem family of data systems from IBM is known for providing efficient, highly functional, high-performance storage for any type of workload. IBM FlashSystem solutions, customized for Entry Enterprise, Midrange Enterprise, and High-End Enterprise workloads, are specifically designed to deliver performance in streamlined packages that are easy to buy, easy to deploy and easy to manage.

## For more information

For more information about the FlashSystem family of data systems, please contact your IBM representative or IBM Business Partner, or visit:

<https://www.ibm.com/it-infrastructure/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](https://www.ibm.com/financing)

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