

# IBM FlashSystem 9200

## NVMe-optimized high-performance storage made simple for the modern multicloud enterprise

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### Highlights

- Accelerate mission-critical applications with IBM FlashCore technology
  - Leverage IBM Spectrum Virtualize for high-performance hybrid multicloud
  - Transform data economics using data reduction with no performance impacts
  - Simplify storage management by extending powerful data services
  - Leverage artificial intelligence (AI) to optimize storage management
  - Deploy leading-edge storage solutions with confidence using IBM FlashWatch
  - Increase cost-efficiency with IBM Storage Utility programs
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Often, applications exist that are foundational to the operations and success of an enterprise. These applications may function as prime revenue generators, they may guide or control important tasks, or they may provide crucial business intelligence, among many other jobs. Whatever their purpose, they are mission-critical to the organization. They demand the highest levels of performance, functionality, security, and availability. To support mission-critical applications, enterprises of all types and sizes turn to IBM FlashSystem 9200.

IBM FlashSystem 9200 combines 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. This powerful new storage platform provides:

- The option to use large capacity IBM FlashCore modules (FCM) with inline-hardware compression, data protection, and innovative flash management features; industry standard NVMe drives; or Storage Class Memory (SCM) drives.
- The software-defined storage functionality of IBM Spectrum Virtualize with a full range of industry-leading data services such as dynamic tiering, IBM FlashCopy management, data mobility, and high-performance data encryption, among many others.
- Innovative data reduction pool (DRP) technology that includes deduplication and hardware-accelerated compression technology, plus SCSI UNMAP support and

all the thin provisioning, copy management, and efficiency you'd expect from IBM Spectrum Virtualize-based storage.



*IBM FlashSystem 9200*

## Performance and flexibility at the core

IBM FlashSystem 9200 provides petabytes of effective data storage in a very efficient two-rack-unit chassis. It utilizes IBM FlashCore technology packaged into a 2.5-inch solid-state drive (SSD) form factor and using an NVMe interface. These FlashCore Modules (FCMs) deliver powerful inline, hardware-accelerated compression technology without performance impact, consistent microsecond latency and extreme reliability.

The IBM FlashCore technology has enabled very high flash density and storage capacity which has been further increased with a new 38.4TB module. In addition, the FCMs have full hot-swap capabilities and support FIPS 140-2 Level 1 encryption with IBM Security Key Lifecycle Manager centralized key management.

The IBM FlashCore Modules can be complemented with Storage Class Memory (SCM) NVMe drive technology. SCM technology offers even lower latency and when combined with FCM drives, can be used for the most demanding workloads.

IBM FlashSystem expands its support of the NVMe fast-access protocol with NVMe-over Fabrics to compatible hosts for complete end-to-end NVMe support. Combined with the existing NVMe capabilities of the systems, they can achieve latency as low as 70 microseconds to accelerate application performance and business productivity.

Flexibility is built into the IBM FlashSystem architecture. You can choose FCMs in multiple capacities, industry-standard NVMe drives or SCM drives to deliver the capacity you need with the performance you require. The IBM FlashSystem 9200R has the capability to support all these drive types simultaneously within the 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 of the rack-based IBM FlashSystem 9200R solutions can range up to 32 petabytes and deliver performance of 180 GB/s throughput and 18 million IOPS.

IBM FlashSystem 9200 features dual canisters, dual power supplies, and redundant cooling. The systems have four Intel Cascade Lake CPUs with 16 cores per controller. Up to 1.5TB of memory can be configured per controller, so that in a single 2U storage array you can leverage the performance and efficiency of more than a terabyte of memory and multiple petabytes of storage, all moving at NVMe speeds, to tackle even the most demanding real-time analytics or AI application workloads. IBM FlashSystem 9200 supports iSCSI Extensions for RDMA (iSER), a new option to deliver high performance over existing ethernet networks.

## Powerful multicloud and container capabilities

IBM Spectrum Virtualize provides the data services foundation for every IBM FlashSystem 9200 solution. Its industry-leading capabilities include a wide range of data services that can be extended to over 500 IBM and non-IBM heterogeneous storage systems; automated data movement; synchronous and asynchronous copy services (either on-premises or to the public cloud); encryption; high-availability configurations; storage tiering; and data reduction technologies, among many others. IBM FlashSystem 9200 solutions can function as IT infrastructure modernization and transformation engines, thanks to the IBM Spectrum Virtualize capabilities that allow you to extend a wide range of data services and functionality to more than 500 legacy external heterogeneous storage systems under the solution's management, reducing both capital and operational costs while increasing the return on your investments in legacy infrastructure.

The IBM Spectrum Virtualize technology within IBM FlashSystem 9200 arrays offers powerful data-reduction pool capabilities that include block deduplication that works to minimize the number of data copies stored, and hardware-accelerated data compression technology that provides consistent, high-performance results across application workload patterns. IBM FlashSystem 9200 DRP supports the SCSI UNMAP command, which allows software to tell the storage system when it's no longer using portions of storage. This capacity is then returned to the pool to be used to satisfy other requirements. Previously, storage would stay assigned even if it was no longer being used, which wastes capacity.

To further drive your IT transformation, IBM Spectrum Virtualize for 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 thanks to 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.

## Cyber resiliency

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 9200 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.

## Cost-efficiency

Automated storage tiering with Easy Tier can help improve performance and lower costs by enabling the more efficient use of flash storage or multiple tiers of drives. Easy Tier automatically identifies more active data and moves that data to faster storage such as Storage Class Memory and FlashCore Modules. This helps organizations leverage flash storage for the data that can benefit the most. Easy Tier can use any supported flash storage to accelerate any other storage, including the new SCM drives. This approach delivers greater benefits from flash storage than tiering systems that are limited to just a single disk system.

## Advanced replication

The IBM Spectrum Virtualize functionality in IBM FlashSystem 9200 is designed to enable administrators to apply across all systems under management a single set of advanced network-based replication services that operate in a consistent manner, regardless of the type of storage being used.

When used with other IBM FlashSystem 9200 products, volumes can be replicated across 3 sites, offering both high availability and data recovery using synchronous and asynchronous data communication.

IBM FlashCopy functionality is designed to create an almost-instant copy (or “snapshot”) of active data that can be used for backup purposes or for parallel processing activities. Up to 256 copies of data may be created.

IBM Spectrum Protect Snapshot is designed to perform near-instant application-aware snapshot backups using FlashCopy local replication, but with minimal impact to IBM DB2, Oracle, SAP, VMware, Microsoft SQL Server, or Microsoft Exchange databases.

IBM FlashSystem 9200 also supports remote mirroring, enabling organizations to create copies of data at remote locations for disaster recovery. Replication can occur between any systems built with IBM Spectrum Virtualize and can involve any supported storage, including cloud. Support for VMware vCenter Site Recovery Manager helps speed disaster recovery.

For IP replication, IBM Spectrum Virtualize uses innovative Bridgewater WANrockIT technology to optimize the use of network bandwidth and can compress data being transmitted to help reduce networking costs and improve remote replica currency.

## High availability

Moving data is one of the most common causes of planned downtime. The IBM Spectrum Virtualize technology within IBM FlashSystem 9200 enables data movement from one storage system to another, or between arrays, while maintaining access to the data. This function can be used when replacing older storage with newer storage, as part of load-balancing work, or when moving data in a tiered storage infrastructure from disk drives to flash.

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.

## Simplified management

IBM FlashSystem 9200 with IBM Spectrum Virtualize is designed to simplify hybrid multicloud 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.

## Virtualization and container support

The IBM Spectrum Virtualize functionality in IBM FlashSystem 9200 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 9200 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 9200 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.

## 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 better, more informed decisions
- AI-enhanced analytics that leverage knowledge from over two exabytes of storage currently 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.

## Deploy with confidence

To enhance the IBM FlashSystem 9200 acquisition, deployment, and operational experience, IBM offers a suite of programs collectively called IBM FlashWatch. This suite of programs includes high availability, data reduction, and flash endurance guarantees; all-inclusive licensing; comprehensive care and cloud-based analytics; cloud-like utility pricing; storage upgrade options; and free data migration for the first 90 days. IBM FlashWatch is driven by the concept – *Storage Made Simple* – and helps increase confidence in purchasing, owning, and

upgrading IBM Storage solutions.

## Storage made simple for hybrid multicloud

IBM FlashSystem 9200 solutions provide a single enterprise class platform to address the full spectrum of 21st-century data storage requirements. From NVMe-powered all-flash performance and IBM FlashCore reliability, through easy integration and almost unlimited scalability, to data services that can transform and modernize existing systems, IBM FlashSystem 9200 is designed to simplify storage and accelerate business productivity.

### IBM FlashSystem 9200 at a glance

<b>Models</b>	<ul style="list-style-type: none"> <li>Control enclosures 9848-AG8, UG8</li> <li>Expansion enclosures AFF, A9F</li> </ul>
<b>Clustering</b>	Up to 4 FlashSystem 9200 control enclosures can be clustered and operated as a single system.
<b>Software</b>	<ul style="list-style-type: none"> <li>IBM Spectrum Virtualize</li> <li>IBM Storage Insights</li> </ul>
<b>Host Interface</b>	Per control enclosure: <ul style="list-style-type: none"> <li>Up to 24 x 16 Gbps Fibre Channel (FC, NVMeoF)</li> <li>Up to 24 x 32 Gbps Fibre Channel (FC, NVMeoF)</li> <li>8 x 10 Gbps Ethernet (iSCSI)</li> <li>Up to 12 x 25 Gbps (iSCSI, iSER - iWARP, RoCE)</li> </ul>
<b>User Interface</b>	GUI, CLI, REST API
<b>Maximum drives supported</b>	<ul style="list-style-type: none"> <li>24 NVMe drives per control enclosure</li> <li>24 2.5" SAS drives per AFF expansion enclosure</li> <li>92 2.5" SAS drives per A9F expansion enclosure</li> <li>Up to a maximum of 760 SAS drives in expansion enclosures per control enclosure</li> </ul>
<b>Supported NVMe drives</b>	FlashCore Modules <ul style="list-style-type: none"> <li>4.8 TB, 9.6 TB, 19.2 TB and 38.4 TB with hardware compression</li> </ul> Storage Class Memory (SCM) <ul style="list-style-type: none"> <li>375 GB, 750 GB, 800 GB, 1.6 TB</li> </ul> Industry-standard NVMe <ul style="list-style-type: none"> <li>800 GB, 1.92 TB, 3.84 TB, 7.68 TB and 15.36 TB</li> </ul>
<b>Supported SAS drives</b>	2.5-Inch SAS SSD 1.6 TB, 1.92 TB, 3.84 TB, 7.68 TB, 15.36 TB and 30.72 TB
<b>RAID levels</b>	DRAID 5 and 6 with dynamic DRAID expansion and TRAIT 1 and 10
<b>Max IOPS (4K read hit)</b>	4.5 million
<b>Minimum latency (4K read hit)</b>	<70 $\mu$ s
<b>Maximum IOPS (4K read miss)</b>	1.2 million
<b>Maximum bandwidth (256KB read miss)</b>	45 GB/s
<b>Core per control enclosure</b>	Four 16-core processors per control enclosure
<b>Cache per control enclosure</b>	From 256 GB up to 1,536 GB per control enclosure
<b>Fans and Power Supplies</b>	Fully redundant, Hot Swappable
<b>Rack Support</b>	Standard 19-Inch
<b>Advanced features</b>	<ul style="list-style-type: none"> <li>Data reduction via thin provisioning, UNMAP, Compression and deduplication</li> <li>Data-at-rest AES-XTS 256 encryption</li> <li>Easy Tier</li> <li>Data migration</li> <li>External virtualization</li> </ul>

<b>Replication features</b>	<ul style="list-style-type: none"> <li>• Flashcopy</li> <li>• Metro Mirror (synchronous)</li> <li>• Global Mirror (asynchronous)</li> <li>• Global Mirror with change volumes</li> <li>• 3 sites replication</li> <li>• Hyperswap (high availability)</li> </ul>
<b>Additional available advanced features</b>	<ul style="list-style-type: none"> <li>• IBM Storage Insights Pro</li> <li>• IBM Spectrum Virtualize for Public Cloud</li> <li>• IBM Spectrum Control</li> <li>• IBM Spectrum Protect Snapshot</li> </ul>
<b>Warranty</b>	<p>9846 Hardware Warranty:</p> <ul style="list-style-type: none"> <li>• 1-year limited warranty</li> <li>• IBM installation</li> <li>• 24 x 7 on-site support</li> <li>• Service upgrades available</li> </ul> <p>9848 Hardware Warranty</p> <ul style="list-style-type: none"> <li>• 3-year limited warranty</li> <li>• IBM installation</li> <li>• 24 x 7 on-site support</li> <li>• Enterprise-Class Support <ul style="list-style-type: none"> <li>◦ Technical Advisor</li> <li>◦ Enhanced response times for sev.1</li> <li>◦ 6 FlashSystem 9200 code upgrades</li> </ul> </li> </ul> <p>Software Warranty</p> <ul style="list-style-type: none"> <li>• 1-year software maintenance</li> <li>• Software maintenance extensions available</li> </ul>
<b>Dimensions</b>	<p>Control enclosures</p> <ul style="list-style-type: none"> <li>• Width: 483 mm (19.0 in.)</li> <li>• Depth: 850 mm (33.5 in.)</li> <li>• Height: 88 mm (3.5 in.)</li> </ul>
<b>Weight</b>	Fully configured 9200 control enclosure (24 drive modules installed): 46.6 kg (102.5 lb)
<b>Supported systems</b>	<p>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></p>
<b>Independent software vendor (ISV) solutions</b>	<p>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></p>

## Why IBM?

IBM offers a vast portfolio of hardware, software and services to help organizations cost-effectively address their IT infrastructure needs. These include robust data-storage solutions to enable always-on, trustworthy storage and recovery from disaster. Because business needs shift, IBM solutions emphasize interoperability and the integration of new use cases or approaches, from analytics to multi-site backup to near-instant recovery. With IBM, organizations can create flexible, robust and resilient storage infrastructure to support critical operations for smooth operations and regulatory compliance.

High-performance hardware grounded in innovative technology and open standards, and a broad portfolio of software and services, are just a few of the reasons to consider storage solutions from IBM. IBM delivers some of the best storage products, technologies, services and solutions in the industry without the complexity of dealing with different hardware and software vendors—all backed by IBM with its recognized industry leadership.

## 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:

<https://www.ibm.com/financing/flash>

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