IBM FlashSystem 9200R | Data sheet

Complete, rack-based, IBM validated and implemented storage solutions with ultra-high throughput and NVMe-optimized flash performance

Highlights

- Deploy complete, rack-based, IBM built and tested storage solutions
- Leverage IBM Spectrum® Virtualize to run high-performance storage solutions
- Construct high-performance hybrid cloud environments
- Manage the most demanding workload requirements
- Transform data economics using data reduction with no performance impact
- Simplify management by extending data services across Storage ecosystems
- Leverage artificial intelligence (AI) to optimize storage management

Modern technologies and tools such as Artificial Intelligence (AI) and the Internet of Things (IoT) generate unprecedented amounts of data. To move enormous data streams at the speeds needed to maximize their value in today's business world requires substantial system bandwidth and extremely low storage latency. Public cloud-based solutions offer the levels of data storage needed – but not the performance or the data resilience. Building large, low latency, ultra-high throughput storage systems on-premises can involve substantial risk and complexity. These are the requirements that the IBM FlashSystem® 9200R solutions were designed to address.

IBM FlashSystem 9200R is a rack-based storage solution engineered to reduce deployment time while providing petabytes of high-performance, cost-efficient storage capacity, extraordinary system bandwidth, ultra-low latency, exceptional configuration flexibility and rock solid data resilience. The solution combines the performance of Non-Volatile Memory Express (NVMe) protocol with the reliability and innovation of IBM FlashCore® technology and the rich feature set and high availability of IBM Spectrum Virtualize. For enterprises that need the additional confidence of a validated system with expert implementation support, IBM FlashSystem 9200R offers an excellent choice.

IBM FlashSystem 9200R

The new, ultra-high throughput storage solutions include:

- A complete, IBM validated, IBM tested storage system with simplified ordering, delivered assembled, with installation and configuration provided by IBM.
- Flexible, high-performance solutions based on two, three, or four IBM FlashSystem 9200 storage arrays with dedicated Fibre Channel network. Thanks to the FlashCore technology with inline hardware compression and data reduction without impact on performance, 16-core Intel Cascade Lake controller processors, and NVMe-optimized IBM FlashSystem architecture, IBM FlashSystem 9200R solutions can offer up to 32 petabytes of usable capacity, 18 million IOPS, and 180 GB/s throughput.
- Software-defined storage functionality provided by IBM Spectrum Virtualize, with a full range of industry-leading data services such as dynamic tiering, IBM FlashCopy® management, Safeguarded Copy, 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
- Dedicated Broadcom Fibre Channel storage system network backbone
- Up to four 2U24 or up to two 5U92 expansion enclosures that support a range of drive options.

Performance and flexibility at the core

Rack-based IBM FlashSystem 9200R solutions are based on clustered IBM FlashSystem 9200 storage arrays. The IBM FlashSystem 9200 arrays utilize 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.

Simplified management

IBM FlashSystem 9200R solutions with IBM Spectrum Virtualize are designed to simplify hybrid cloud storage environments from the very start. The solutions 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.

Rock solid data resilience

Moving data is one of the most common causes of planned downtime. The IBM Spectrum Virtualize technology within IBM FlashSystem 9200R solutions enables data movement from one storage system to another, or between systems, 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.

IBM HyperSwap® function supports storage and servers in two or 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 it is implemented by IBM Lab Services IBM can guarantee 100% availability. 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.

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 9200R 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.

With Safeguarded Copy, IBM adds a line of defense against cyber threats by protecting your valued data from cyberattacks with immutable and isolated copies that are hidden, non-addressable and cannot be altered or deleted. In the event of an attack, these copies can be quickly restored to support recovery. In addition, physical isolation layers can also be created by storing sensitive copies in immutable storage, cloud environments or off-line write-once read many (WORM) tape devices to provide physical air-gap protection.

And with more organizations looking to adopt data resilience solutions that go beyond simple data backup and recovery, the IBM Spectrum Protect portfolio is the perfect complement for IBM FlashSystem. It provides unified end-to-end workload protection, both on-premises and in the cloud, including applications, VMs, file systems, SaaS workloads, AWS EC2 instances, and containers.

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Powerful cloud capabilities

IBM Spectrum Virtualize provides the data services foundation for every IBM FlashSystem 9200R solution. It includes industry-leading capabilities such as strong encryption; high-availability configurations; storage tiering; data reduction technologies; automated data movement; and synchronous and asynchronous copy services (either on-premises or to the public cloud); among many other services.

IBM FlashSystem 9200R 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 IBM and non-IBM heterogeneous storage systems under management, reducing both capital and operational costs while increasing the return on investments in legacy infrastructure.

The IBM Spectrum Virtualize 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. 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, combining IBM FlashSystem 9200R with IBM Spectrum Virtualize for Public Cloud offers multiple ways to create hybrid cloud solutions between on-premises private clouds and the public cloud. The common platform brings consistency to enable real-time storage-based data replication and disaster recovery, as well as data migration between local storage and IBM Cloud, Amazon Web Services (AWS) or Microsoft Azure. 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.

Virtualization and container support

The IBM Spectrum Virtualize functionality in IBM FlashSystem 9200R solutions 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 9200R is designed to become an almost entirely automated function.

Containers are an open-source technology that wrap 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 9200R 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.

Cost-efficiency

Automated storage tiering with IBM 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 9200R solutions 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 FlashSystem 9200R solutions also support 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 Bridgeworks 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.

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
- Monitoring of Brocade and Cisco switches and fabrics to help identify saturation, congestion, and fabric errors that might impact your storage performance
- 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 9200R 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; Storage Expert Care and cloud-based analytics; cloud-like utility pricing; storage upgrade options; and free data migration for the first 90 days. IBM FlashWatch increases confidence in purchasing, owning, and upgrading IBM Storage solutions.

IBM Storage Expert Care Premium service and support is simple. Get exclusive benefits such as a dedicated Technical Account Manager, access to IBM Storage Insights Pro, remote code loads and even faster response times with predictable and upfront pricing that is a fixed percentage of the system cost.

Storage made simple for hybrid cloud

IBM FlashSystem 9200R 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 9200R is designed to simplify storage and accelerate business productivity.

IBM FlashSystem 9200R at a glance

Models	9848 Model AG8
Clustering	• 2, 3 or 4 clustered FlashSystem 9200 arrays with a dedicated pair of 32 Gbps Fibre Channel switches within a rack • Packaged as 9202R, 9203R and 9204R
Software	• IBM Spectrum Virtualize • IBM Storage Insights
Host Interface	GUI, CLI, REST API
Maximum drives supported	Up to 96 NVMe and 2,944 SAS drives per 4-way clustered system
Supported NVMe drives	FlashCore Modules: • 4.8 TB, 9.6 TB, 19.2 TB and 38.4 TB with hardware compression Storage Class Memory (SCM): • 375 GB, 750 GB, 800 GB, 1.6 TB Industry Standard NVMe: • 800 GB, 1.92 TB, 3.84 TB, 7.68 TB and 15.36 TB
Supported SAS drives	2.5-inch SAS SSD: • 1.6 TB, 1.92 TB, 3.84 TB, 7.68 TB, 15.36 TB and 30.72 TB
RAID levels	DRAID 1, 5 and 6 with dynamic DRAID expansion and TRAID 1 and 10
Maximum IOPS (4k read hit)	18 million
Minimum latency (4k read hit)	<70 µs
Maximum IOPS (4k read miss)	4.8 million
Maximum bandwidth	180 GB/s
Cores per cluster	Sixteen 16-core processors in a 4-way clustered system
Cache per cluster	Up to 6,144 GB in a 4-way clustered system
Fans and power supplies	Fully redundant, hot-swappable
Rack support	Standard 19-Inch
Advance features	• Data reduction via thin provisioning • UNMAP, compression, and deduplication • Data-at-rest AES-XTS 256 encryption • Safeguarded copy • Easy Tier • Data migration • External virtualization
Replication features	• FlashCopy • Metro Mirror (Synchronous) • Global Mirror (asynchronous) • Global Mirror with change volumes • 3 Sites replication • Hyperswap (High availability)

Additional available advanced features	• IBM Storage Insights Pro • IBM Spectrum Virtualize for Public Cloud • IBM Spectrum Control • IBM Spectrum Protect • IBM Spectrum Protect Plus
Warranty	FlashSystem 9200 (machine type 9848) hardware warranty: • 3-year limited warranty • IBM Installation • 24 x 7 on-site support • Enterprise-Class Support: ◦ Dedicated Technical Advisor ◦ Enhanced response times for sev.1 ◦ 6 remote code upgrades FlashSystem 9200 (machine type 4666) hardware warranty: • 1-year limited warranty • IBM Installation • 24 x 7 on-site support • 3-year IBM Storage Expert Care Premium: ◦ 24x7 on-site hardware support ◦ Dedicated Technical Account Manager ◦ Enhanced response times for sev.1 and 2 ◦ 6 remote code upgrades ◦ Guidance on installation, usage, and configuration ◦ Automated ticket management and alerting ◦ Predictive issue resolution Software warranty: IBM Spectrum Virtualize Software for FlashSystem 9200 governed by the IBM International Program License Agreement • 1-year software warranty • Software maintenance extensions available • Software maintenance is included in Storage Expert Care
Dimensions	External dimensions of Rack • Width: 600 mm (23.6 in.) • Depth: 1,201mm (47.3 in.) • Height: 2020 mm (79.5 in.)
Weight	Fully configured 9204R (One of S42 rack, four of 9200 control enclosures, two switches, and two of A9F enclosures): 658 kg (1444 lb)
Supported systems	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: https://www.ibm.com/systems/support/storage/ssic/interoperability.wss

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.

Innovative technology, open standards, excellent performance, and a broad portfolio of proven storage solutions backed by IBM's global presence and leadership – these are just a few of the reasons you should consider deploying comprehensive IBM FlashSystem 9200R storage solutions.

For more information

Visit our solutions page to learn more about the FlashSystem family of data systems, or contact your IBM representative or IBM Business Partner. If you need to be connected, fill out this form to schedule a consult with an IBM storage expert.

Additionally, IBM Global Financing provides numerous payment options to help you acquire the technology you need to grow your business. We provide full life cycle management of IT products and services, from acquisition to disposition. Visit: https://www.ibm.com/financing/flash