IBM.

IBM FlashSystem 5100

NVMe-accelerated performance and proven, wide-ranging functionality in affordable storage solutions

Highlights

- Provides storage virtualization with the speed of NVMe-optimized flash
- Leverages the power of IBM Spectrum Virtualize for rich data services
- Offers data reduction pools with deduplication and compression
- Brings hybrid cloud storage capabilities to increase business agility
- Simplifies storage management with an innovative user interface
- Extends wide-ranging data services across hundreds of external systems
- Includes powerful AI-enhanced tools to optimize storage operations

Enterprises today are rapidly adopting leading-edge technologies such as real-time analytics, artificial intelligence (AI) and blockchain, among others. These powerful new technologies require IT infrastructure that provides great flexibility and scalability, wide-ranging data services, seamless movement within multicloud architectures, and perhaps most importantly — Speed.

The Non-Volatile Memory Express (NVMe) protocol is one of the most powerful new innovations designed to dramatically accelerate data processing. IBM Storage has been rapidly moving forward with implementing NVMe-based solutions across its entire storage portfolio. The IBM FlashSystem family of data systems has already incorporated NVMe capabilities into its High-End Enterprise and Midrange Enterprise FlashSystem. With the introduction of the IBM FlashSystem 5100, IBM integrates the speed and efficiency of NVMe technologies into the Entry Enterprise line designed to provide affordable, highly functional, high-performance storage solutions for enterprises of all sizes. For clients using ethernet for storage networking, IBM FlashSystem 5100 supports iSCSI Extensions for RDMA (iSER), a new option to deliver high performance over lower-cost Ethernet networks.

IBM FlashSystem 5100

A family of affordable, high-performance storage solutions

With comprehensive storage services and capabilities based on market-leading IBM Spectrum Virtualize technologies, IBM FlashSystem family offers feature-rich, affordable storage solutions for 21st-century enterprises looking to grow and thrive.

IBM FlashSystems 5010, 5030 and 5100 are designed to provide the entry enterprise solutions within the overall family. IBM FlashSystem technology has recently been refreshed, with a focus on significant new innovation.

More than ever before, IBM FlashSystem 5010, 5030 and 5100 models are easy to deploy, easy to use and easy to grow. They enable Enterprises of all types and sizes to efficiently and affordably meet the challenges of rapid data growth and constrained IT budgets. The systems leverage the cost advantages of multiple flash drive options for low deployment costs, plus feature an intuitive user interface, synchronous/asynchronous replication, more than 600 application programming interfaces (APIs), thin provisioning and snapshots. Plus, IBM FlashSystems provide affordable, nondisruptive upgrade paths that deliver increased performance, scalability, and functionality.

IBM FlashSystem 5100

Now, the IBM FlashSystem 5100 and IBM FlashSystem 5100H models bring NVMe technology into the affordable entry Enterprise. IBM FlashSystem 5100 combines NVMe-powered IBM

FlashCore technology with a rich set of IBM Spectrum Virtualize features, including external virtualization and two-way clustering. Unique high-performance, IBM FlashCore Modules (FCM) can be mixed with standard NVMe solid-state drives (SSDs) to balance speed and cost-efficiency, while IBM Spectrum Virtualize for Public Cloud enables almost unlimited storage capacity by seamlessly integrating on-premises and cloud resources into one management domain.

IBM FlashSystem 5100 solutions are:

- **NVMe-accelerated flash arrays** with control enclosures that are 100 percent, end-to-end NVMe-enabled, and Storage Class Memory (SCM)-capable. The systems offer industry-leading performance and scalability and support physical, virtual and Docker environments.

- **Hybrid Flash array enabled** with multiple expansion enclosure options based on 12 Gb/s SAS that support both SSDs and hard disk drives.

- **AI-enhanced** with 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.

- **Hybrid Multicloud ready** and can support private, hybrid or public cloud deployments. The solutions come with ready-to-use, proven, validated "multicloud blueprints" with support for multicloud API automation, replication and secondary data orchestration software.

IBM FlashSystem 5100 also provides flash-optimized data compression and deduplication, enterprise-grade system availability, and data-security features that include the nondisruptive data migration and remote mirroring using IBM HyperSwap technology that are shared by all IBM Spectrum Virtualize-based systems, plus "six nines" availability, data-at-rest encryption, and a new distributed RAID technology that can reduce disk rebuild times up to 10 times over current RAID solutions. For organizations that need affordable high-performance storage with Fortune 500-level functionality plus a broad spectrum of data services, IBM FlashSystem 5100 offers enterprise-grade storage solutions that truly are easy to deploy, easy to use and easy to grow.

Powerful to the core

IBM FlashSystem 5100 leverages the advantages of IBM FlashCore-enhanced technology storage media that provides greater flash density and a larger capacity than other industry-standard flash drives solutions. The purpose-engineered large capacity IBM FlashCore Module (FCM) utilizes powerful inline, hardware-accelerated data compression and encryption technologies that provide consistent, high-performance compression and encryption across the full range of workloads. The large capacity FCM is designed to support Federal Information Processing Standard (FIPS) 140-2 Level 1 encryption[1] with IBM Security Key Lifecycle Manager centralized key management and full hot-swap capabilities.

You can choose large capacity IBM FlashCore Module (FCM) in multiple capacities, or you can opt for industry-standard NVMe-enabled flash drives, with the capability to support both drive types simultaneously within the array. This means that, by using the always-on, inline, high-performance data compression in the FCM or Data Reduction Pool (DRP) technology with the industry-standard drives, effective capacities can range up to two petabytes in a single 2U enclosure, with the ability to cluster, scale-out, or scale-up capacity and performance to many petabytes and hundreds of thousands of input/output operations per second (IOPS).

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 5100 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.

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 is the number-one SDS vendor in the industry.[2] 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 nondisruptive 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 hundreds of external, heterogeneous storage systems from a wide variety of vendors

- Powerful DRP technology that includes deduplication, compression, and automated thin provisioning

- IBM Easy Tier automated tiering functionality

- Hardware-based or inline software encryption that can be extended across all managed systems

- IBM FlashCopy and IBM Remote Mirror for local and remote three-site replication

- Support for using cloud resources to complement on-premises storage

IBM Spectrum Virtualize in FlashSystem 5100 enables the use of cloud storage for disaster recovery, dramatically speeds deployment of hybrid cloud configurations and helps slash storage costs. The IBM FlashSystem 5100 system comes in a standard all-flash configuration, then offers multiple options to extend and expand capacity and performance with flash or disk drives.

IBM FlashSystem 5100 can lower both capital expenditures and operational costs by extending its 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 become part of the 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 5100 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.

Cost-efficiency at the core

Data Reduction Pools within the IBM FlashSystem 5100 solution help transform the economics of data storage. When applied to new or existing storage, they can significantly increase usable capacity while maintaining consistent application performance. This can help eliminate or drastically reduce costs for storage acquisition, rack space, power, and cooling, and can extend 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

Enterprise-grade data protection and system availability

IBM FlashSystem 5100 also provides enterprise-grade system availability and data security, "six nines" availability, three-site replication, data-at-rest encryption, and distributed RAID technology that can reduce drive rebuild times up to 10 times over current RAID solutions. HyperSwap functionality enables a single IBM FlashSystem 5100 system 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 virtual machine 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.

Easier management

IBM FlashSystem 5100 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 Spectrum Control, a member of the industry-leading IBM Spectrum Storage family of SDS solutions, can provide organizations with an end-to-end view of storage health, long-term performance analytics and capacity statistics for IBM FlashSystem 5100 and the surrounding storage infrastructure.

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, 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.

Multicloud capabilities

IBM Spectrum Virtualize for Public Cloud functionality enables the replication of heterogeneous storage between on-premises data centers and IBM Cloud or 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.

With its virtualized storage design and tight affinity with PowerVM, OpenStack, Microsoft Hyper-V, VMware vSphere v6 and VMware vSphere Virtual Volumes (VVOL), Kubernetes, and Docker containers, IBM FlashSystem 5100 makes an ideal complement for virtualized servers that are at the heart of cloud deployments.

World-class support

IBM FlashSystem family solutions offer three new customer support and product upgrade programs:

- 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.

[1] "NVMe over Fibre Channel for Dummies," *Brocade special edition, Wiley Brand*, 2017.

[2] "IBM Ranked # 1 in Worldwide Software-Defined Storage Software Market," *IBM Corporation*, April 2017.
http://www-03.ibm.com/press/us/en/pressrelease/52189.wss

IBM Flashsystem 5100 at a glance

Models	• IBM FlashSystem 5100, model 4H4
Host interface	10 Gbps Ethernet (iSCSI), 25 Gbps Ethernet (iSCSI, iSER - iWARP, RoCE) 16 Gbps Fibre Channel (FC, FC-NVMe), 32 Gbps Fibre Channel (FC, FC-NVMe)
User interface	Web GUI
Supported drives	2.5-inch NVMe FCM • 4.8 TB, 9.6 TB, 19.2 TB and 38.4 TB self-compressing FCM 2.5-inch NVMe flash drives • 800 GB, 1.92 TB, 3.84 TB, 7.68 TB and 15.36 TB
Max IOPs	900K IOPs
Min Latency	Under 70µs
Max Bandwidth	15 Gb/S
RAID levels	Distributed RAID 5 and 6, TRAID 1 and 10
Maximum drives supported	760 per control enclosure; 1,520 per clustered system
SAS expansion enclosures	Control enclosure model 4H4 supports the following expansions: • Model 12G/24G 2U 12 or 24 drive • Model 92G 5U 92 drive 2.5-inch flash drives supported: • 800 GB, 1.6 TB, 1.92 TB, 3.84 TB, 7.68 TB, 15.36 TB and 30.72 TB 2.5-inch disk drives supported: • 600 GB, 900 GB, 1.2 TB, 1.8 TB and 2.4 TB 10k SAS disk • 2 TB 7.2k nearline SAS disk 3.5-inch disk drives supported: • 4 TB, 6 TB, 8 TB, 10 TB, 12 TB,14 TB and 16 TB 7.2k nearline SAS disk
Fans and power supplies	Fully redundant, hot-swappable
Rack support	Standard 19-inch
Management software	IBM Spectrum Virtualize software
Cores per control enclosure/clustered system	16/32
Cache per control enclosure/clustered system	64 or up to 576 GB/128 GB or up to 1.15 TB
Advanced features included with each system	• Virtualization of internal storage • Data migration • Data Reduction Pools with thin provisioning • UNMAP • Compression and deduplication
Additional available advanced features	• Remote mirroring • Easy Tier compression • External virtualization • Encryption • FlashCopy • IBM Spectrum Control • IBM Spectrum Protect Snapshot
Warranty	Hardware: • 1-year or 3-year limited warranty depending on MT • Customer-replaceable units • On-site service • Next business day between 9 a.m. and 5 p.m. • Service upgrades available Software: • Software maintenance agreement available
Replication services	• FlashCopy • IBM Spectrum Protect Snapshot • Metro Mirror (synchronous) and Global Mirror (asynchronous)
Dimensions	Control enclosures • Width: 483 mm (19.0 in.) • Depth: 850 mm (33.5 in.) • Height: 88 mm (3.5 in.)
Weight	Control enclosures: • Fully configured (24 drive modules installed): 46.6 kg (102.5 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
Independent software vendor (ISV) solutions	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. https://www.ibm.com/partnerworld/wps/pub/systems/whyibm/programs

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