IBM FlashSystem 5000 | Data sheet

IBM FlashSystem 5015 and 5035 offer the performance, functionality and affordability demanded by entry enterprise workloads.

Highlights

- Offers easy-to-own, easy-to-use, easy-to-grow flexibility
- Provides affordable, enterprise-grade functionality and performance
- Enables data mobility to support hybrid cloud deployments
- Built with the rich enterprise data services of IBM Spectrum Virtualize
- Leverages AI to optimize data placement and streamline management
- Ensures business continuity with multi-layered data resilience features

Leading-edge technologies such as artificial intelligence (AI), real-time analytics, and blockchain demand new levels of IT infrastructure performance and functionality for many reasons, but top of the list is because by their very nature they produce and consume enormous amounts of data.[1]

Businesses of all sizes, including small businesses, remote and branch offices require a modern IT infrastructure with wide-ranging capabilities, from intelligent system optimization and powerful data reduction, through comprehensive security and encryption features, to cloud architectures and ultra-low latency flash storage. These demands can be especially challenging in environments with smaller and mid-sized application workloads, because organizations with smaller workloads quite often operate with smaller IT budgets.

Because capital funds are at a premium, businesses need to preserve and extend their current investments in IT infrastructure, while upgrading outdated features. So, pay-as-you-go strategies become especially attractive. Data security can't be compromised. Agility may be even more important than ever before, so infrastructure flexibility and scalability are crucial.

IBM FlashSystem 5000 storage systems are designed specifically to address entry enterprise workloads. These storage solutions are focused on affordability with a wide range of enterprise-grade features that can easily evolve as

your business grows. And you can even choose to extend award-winning software-defined storage functionality across all your existing systems to optimize current IT investments while building a leading-edge, cloud-capable business platform.

IBM FlashSystem 5000

IBM FlashSystem 5000

IBM FlashSystem 5000 storage systems are designed to provide market leader entry level enterprise solutions within the overall FlashSystem family. IBM FlashSystem 5000 technology has recently been refreshed, with a focus on significant innovation. FlashSystem 5000 offerings include IBM FlashSystem 5015, designed for entry-level storage requirements, IBM FlashSystem 5035 with increased functionality and performance for entry workloads.

The new IBM FlashSystem 5000 models offer even greater affordability than before, with a wide range of performance and feature options:

- ***IBM FlashSystem 5015*** is an entry-level solution focused on affordability and ease of deployment and operation, with powerful scale-up features. It includes many IBM Spectrum Virtualize features and offers multiple flash and disk drive storage media and expansion options.
- ***IBM FlashSystem 5035*** provides greater functionality, including powerful encryption capabilities and data reduction pools with compression, deduplication, thin provisioning, and the ability to cluster for scale-up and scale-out.

More than ever before, FlashSystem 5000 models are easy to buy, easy to use and easy to grow:

- IBM FlashSystem 5015 and FlashSystem 5035 are **easy to buy** because they are simple. Just one thing to order and you get a storage solution ready to install and run. Additionally, IBM

Global Financing provides numerous payment options to help with system acquisition plus full lifecycle management through to disposition.

- They're **easy to deploy**, with enterprise-grade capabilities such as AI-powered IBM Easy Tier functionality that ensures your data is on the right type of storage—automatically. All IBM storage solutions are supported by AI-enhanced IBM Storage Insights that monitors your storage environment, so you don't have to. It lets you know when something needs your attention and can even recommend what to do. And when support from IBM is needed, Storage Insights helps streamline your experience.
- They're **easy to grow** because you can quickly and easily add capacity without disruption. A single FlashSystem 5015 array can scale up to the size of a FlashSystem 5035 array with 504 drives per system, and up to 1,008 drives in two-way clustered systems. They work with your applications today, and the ones you will develop tomorrow, to address workloads using new technologies such as containers and cloud architectures.

Enhanced storage capabilities

All FlashSystem solutions leverage the proven capabilities of IBM Spectrum Virtualize software-defined storage (SDS) for storage management. IBM is the number-one SDS vendor in the industry.[2] IBM Spectrum Virtualize enables applications to run without disruption, even when changes are made to the storage infrastructure.

IBM Spectrum Virtualize has been helping enterprises improve infrastructure flexibility and data economics for more than 15 years. When virtualized, data in a storage system becomes part of the FlashSystem solution, and it can be managed in the same way as internal drives. Data in external systems inherit all the FlashSystem functional richness and ease-of-use features, including advanced replication, high-performance thin provisioning, encryption, compression, deduplication, and Easy Tier functionality. Depending on the FlashSystem model and the options you choose, IBM Spectrum Virtualize can deliver a wide spectrum 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 more than 500 external storage systems from a wide variety of vendors
- Powerful data reduction pool technology that includes deduplication, compression, and automated thin provisioning
- Easy Tier automated tiering functionality

- IBM FlashCopy and IBM Remote Mirror for local and remote replication
- Support for using cloud resources to complement on-premises storage
- Three-site data replication capabilities

Data availability is crucially important to the business because downtime causes immediate business impacts, including loss of customer loyalty and significant financial costs. IBM Spectrum Virtualize in FlashSystem 5015 and FlashSystem 5035 can deliver “six nines” (99.9999%) data availability. These systems are designed for high availability, with no single point of failure, enterprise-proven control software, and nondisruptive maintenance. In addition, cloud-based Storage Insights functionality available with FlashSystem 5035 helps detect configuration errors to improve availability.

IBM FlashSystem 5000 can operate in 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 CapEx 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.

To further enhance data protection and system recoverability, IBM has also included three-site replication on the FlashSystem 5035 array using a combination of FlashCopy and remote copy. This IBM Spectrum Virtualize-powered three-site replication capability runs data copies at both metro and global distances to offer a variety of recovery point and time options.

Increased efficiency

Available with the IBM FlashSystem 5035 model, data reduction pools 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. Capabilities include:

- Block deduplication that works across all the storage in a data reduction pool to minimize the number of identical blocks
- New compression technology that provides guaranteed consistent 2:1 or better reduction performance across a wide range of application workload patterns
- SCSI UNMAP support that deallocates physical storage when operating systems delete logical storage constructs such as files in a file system

Improved data mobility

AI-enhanced Easy Tier provides automatic migration of frequently accessed data to high-performance flash storage or multiple tiers of disk drives, enhancing storage efficiencies. Operating at very fine granularity, the optional Easy Tier function automatically moves data to the optimal storage type based on input/output patterns and drive characteristics, requiring no administrative interaction.

Rock solid data resilience

IBM FlashSystem 5000 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.

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. To help protect sensitive data from unauthorized users, IBM FlashSystem 5035 gives IT teams the full power of storage encryption. In addition to placing encryption inside hardware arrays, IBM Spectrum Virtualize includes encryption capabilities in its management layer.

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.

Innovative virtualization and container technologies

IBM Spectrum Virtualize in FlashSystem 5000 systems complements server virtualization with technologies such as PowerVM, Microsoft Hyper-V, VMware vSphere, and the container technologies Kubernetes and Docker.

Similar to virtualized servers, provisioning FlashSystem 5000 capacity is achieved with software and thin provisioning and is designed to be an almost entirely automated function. Without these technologies, provisioning servers could be slowed by the need to provision storage.

Containers enable applications to be packaged with everything needed to run identically in any environment. They offer the versatility of virtual machines, but at a much smaller footprint and cost. As a result, containerization is a key enabling technology for flexibly delivering workloads to private and public cloud and DevOps. Using the IBM storage container plug-in framework,

FlashSystem 5000 systems can enable any supported storage to be used as persistent storage in Docker and Kubernetes container environments, improving flexibility, simplifying deployment, and lowering costs while offering enterprises the confidence of deploying stateful containers using highly available storage with enterprise capabilities.

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 the block storage under management at a glance
- Trend information about capacity and performance so you can make better and more informed decisions
- Storage and storage network 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.

Powerful added features

In addition to the many features and capabilities noted above, IBM FlashSystem 5000 systems include:

- Innovative management capabilities to ease storage management
- High-availability configurations with HyperSwap for FlashSystem 5035
- IBM Distributed RAID 1, designed for improved performance with small configurations
- FlashCopy function and remote mirroring to create copies of data for back up and disaster recovery

- Dual clustering for FlashSystem 5035 to enable growth from smaller configurations
- Options to nondisruptively upgrade in the field from FlashSystem 5015 to FlashSystem 5035, providing investment protection with the ability to grow capacity and performance in the same footprint
- High-density expansion enclosures, which can hold up to 92 drives and 2.8 PB in a 5U form factor
- The option to add IBM Spectrum Virtualize for Public Cloud to enable data migration between on-premises and public cloud storage including IBM Cloud, Amazon Web Services (AWS) and Microsoft Azure, as well as the use of these cloud platforms for disaster recovery
- Support for OpenStack Cinder, which helps automate storage provisioning and volume management for organizations by combining the efficiency of FlashSystem 5000 with the OpenStack Compute cloud platform

Deploy with Confidence

In addition to the performance, capacity and scalability benefits, each IBM FlashSystem 5000 deployment includes IBM FlashWatch programs. This comprehensive suite of flash storage is designed to enhance the end-to-end ownership experience, providing the confidence to purchase, own and upgrade IBM Storage. The FlashWatch programs include:

- **High availability guarantee.** High-availability capability in IBM Spectrum Virtualize enables IBM FlashSystem 5000 arrays to deliver six-nines (99.9999%) availability. FlashSystem 5035 has IBM HyperSwap® configurations available with optional 100% high availability guarantees 3-site replication, and replication to hybrid cloud deliver comprehensive options to meet a wide range of business continuity needs.[3]
- **Data reduction guarantee.** This program delivers the level of data reduction your IBM FlashSystem 5035 solution will provide.[4] You can get the express version, which provides a 2:1 data reduction without system analysis. Or you can use one of the IBM system analysis tools and choose the flexible option that provides up to a 5:1 data reduction with workload profiling based on the system analysis results.
- **Predictive analytics & proactive management.** AI-powered IBM Storage Insights uses cloud-based, predictive analytics to optimize storage use and delivers proactive capabilities to streamline support at no extra cost, so you can proactively manage your environment.
- **IBM Flash Momentum.** The same innovation that constantly creates remarkable IT infrastructure improvements also accelerates IT infrastructure obsolescence. The IBM Flash Momentum program allows you to refresh your controller and storage every 3 years with full

flexibility. If you finance an IBM FlashSystem over a 3-year term, just before the 3 years expire, you can decide whether to keep it, refresh it or simply walk away. You can refresh your IBM FlashSystem for the same monthly price or less or size your system up or down to meet your needs.

- **No-cost migration.** When you deploy your new IBM FlashSystem 5000 solution, you have up to 90 days to migrate data from over 500 storage controllers at no extra charge.

[1] "Deep Learning (deep neural network)," *TechTarget.com*, Accessed March 2019. https://searchenterpriseai.techtarget.com/definition/deep-learning-deep-neural-network

[2] "IBM Ranked # 1 in Worldwide Software-Defined Storage Software Market," *IBM Corporation*, April 2017.

[3] The Total Economic Impact Of IBM Spectrum Virtualize, A Forrester Total Economic Impact Study, Commissioned by IBM, April 2020

[4] Subject to signing a data reduction contract. 2:1 data reduction is self-certified. Up to 5:1 data reduction with workload profiling. IBM FlashWatch replaces all previous "Controller Upgrade" and "Peace of Mind" Programs, commencing with purchases made on or after 11 February 2020. Program applicability varies by product. Check "FlashWatch Product Matrix".

IBM FlashSystem 5000 at a glance

Specifications	IBM FlashSystem 5035 with IBM Spectrum Virtualize Software	IBM FlashSystem 5015 with IBM Spectrum Virtualize Software
Models	**IBM FlashSystem 5035 Models 2072-3N2 and 2072-3N4**	**IBM FlashSystem 5015 Models 2072-2N2 and 2072-2N4**
User interface	Web-based GUI	Web-based GUI
Single or dual controller	Dual (Active/Active)	Dual (Active/Active)
Connectivity (standard)	10 Gb iSCSI (On the motherboard)	1 Gb iSCSI (On the motherboard)
Connectivity (optional)	• 16 Gb/s Fibre Channel • 12 Gb/s SAS • 25 Gb/s iSCSI • 10 Gb/s iSCSI	• 16 Gb/s Fibre Channel • 12 Gb/s SAS • 25 Gb/s iSCSI (iWARP or RoCE) • 10 Gb/s iSCSI
Cache per control enclosure /clustered system	32GB or 64GB / 64GB or 128GB	32 GB or 64 GB
Max IOPs	1.2M IOPs	400K IOPs
Min latency	Under 70µs	Under 70µs
Max bandwidth	12GB/s	8GB/s

Specifications	IBM FlashSystem 5035 with IBM Spectrum Virtualize Software	IBM FlashSystem 5015 with IBM Spectrum Virtualize Software
Models	**IBM FlashSystem 5035 Models 2072-3N2 and 2072-3N4**	**IBM FlashSystem 5015 Models 2072-2N2 and 2072-2N4**
Drives supported	Small form-factor 2.5-inch disk drives: • 900 GB, 1.2 TB, 1.8 TB and 2.4 TB @ 10k rpm • 2 TB @ 7.2k rpm SAS nearline Large form-factor 3.5-inch disk drives: • 900 GB, 1.2 TB, 1.8 TB and 2.4 TB @ 10k rpm, SAS (2.5-inch drive in a 3.5-inch drive carrier) • 4 TB, 6 TB, 8 TB, 10 TB, 12 TB, 14 TB, 16 TB, 18 TB @ 7.2k rpm 2.5-inch flash drives: • 800 GB, 1.92 TB, 3.84 TB, 7.68 TB, 15.36 TB and 30.72 TB	Small form-factor 2.5-inch disk drives: • 900 GB, 1.2 TB, 1.8 TB and 2.4 TB @ 10k rpm • 2 TB @ 7.2k rpm SAS nearline Large form-factor 3.5-inch disk drives: • 900 GB, 1.2 TB, 1.8 TB and 2.4 TB @ 10k rpm, SAS (2.5-inch drive in a 3.5-inch drive carrier) • 4 TB, 6 TB, 8 TB, 10 TB, 12 TB, 14 TB, 16 TB, 18 TB @ 7.2k rpm 2.5-inch flash drives: • 800 GB, 1.92 TB, 3.84 TB, 7.68 TB, 15.36 TB and 30.72 TB
Maximum drives supported	Maximum of 504 drives per system and 1,008 drives in two-way clusters: • 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	Maximum of 392 drives per system: • 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
Maximum expansion enclosure capacity	• Up to 20 standard expansion enclosures per controller • Up to 8 high-density expansion enclosures per controller	• Up to 10 standard expansion enclosures per controller • Up to 4 high-density expansion enclosures per controller
RAID levels	Distributed RAID 1, 5 and 6	Distributed RAID 1, 5 and 6
Fans and power supplies	Fully redundant, hot-swappable	Fully redundant, hot-swappable
Rack support	Standard 19-inch	Standard 19-inch
Advanced functions included with each system	• Virtualization of internal storage • Data reduction pools with thin provisioning, UNMAP, compression and deduplication • One-way data migration • Dual-system clustering	• Virtualization of internal storage • Data reduction pools with thin provisioning and UNMAP • One-way data migration
Additional available advanced functions	• 90-day trial available • Easy Tier • FlashCopy • Remote mirroring • Encryption	• 90-day trial available • Easy Tier • FlashCopy • Remote mirroring

Specifications	IBM FlashSystem 5035 with IBM Spectrum Virtualize Software	IBM FlashSystem 5015 with IBM Spectrum Virtualize Software
Models	**IBM FlashSystem 5035** **Models 2072-3N2 and 2072-3N4**	**IBM FlashSystem 5015** **Models 2072-2N2 and 2072-2N4**
Size	8.7 cm (3.4 in.) H x 48.3 cm (19.0 in.) W x 55.6 cm (21.9 in.) D Approximate weight: – Large form-factor control enclosure: • Empty: 18.0 kg (39.6 lb) • Fully configured: 28.3 kg (62.2 lb) – Large form-factor expansion enclosure: • Empty: 16.4 kg (36.1 lb) • Fully configured: 26.7 kg (58.8 lb) – Small form-factor control enclosure: • Empty: 19.0 kg (41.8 lb) • Fully configured: 27.3 kg (60.0 lb) – Small form-factor expansion enclosure: • Empty: 16.7 kg (36.7 lb) • Fully configured: 25.0 kg (55.2 lb)	8.7 cm (3.4 in.) H x 48.3 cm (19.0 in.) W x 55.6 cm (21.9 in.) D Approximate weight: – Large form-factor control enclosure: • Empty: 18.0 kg (39.6 lb) • Fully configured: 28.3 kg (62.2 lb) – Large form-factor expansion enclosure: • Empty: 16.4 kg (36.1 lb) • Fully configured: 26.7 kg (58.8 lb) – Small form-factor control enclosure: • Empty: 19.0 kg (41.8 lb) • Fully configured: 27.3 kg (60.0 lb) – Small form-factor expansion enclosure: • Empty: 16.7 kg (36.7 lb) • Fully configured: 25.0 kg (55.2 lb)
Operating environment	Air temperature: – Operating: 10°C – 35°C (50°F – 95°F) at 30.5 m below to 3,000 m above sea level (100 ft below to 9,840 ft above) – Non-operating: -10°C – 50°C (14°F – 125°F) Relative humidity: – Operating: 20% – 85% – Non-operating: 8% – 80%	Air temperature: – Operating: 10°C – 35°C (50°F – 95°F) at 30.5 m below to 3,000 m above sea level (100 ft below to 9,840 ft above) – Non-operating: -10°C – 50°C (14°F – 125°F) Relative humidity: – Operating: 20% – 85% – Non-operating: 8% – 80%
Warranty	Hardware: – Three-year warranty with 9 to 5 next-business-day response – Tier 1 customer-replaceable units and on-site repairs – Warranty service upgrades available Post-warranty support available Customer setup (initial installation and field upgrades)	Hardware: – Three-year warranty with 9 to 5 next-business-day response – Tier 1 customer-replaceable units and on-site repairs – Warranty service upgrades available Post-warranty support available Customer setup (initial installation and field upgrades)

Specifications	IBM FlashSystem 5035 with IBM Spectrum Virtualize Software	IBM FlashSystem 5015 with IBM Spectrum Virtualize Software
Models	**IBM FlashSystem 5035 Models 2072-3N2 and 2072-3N4**	**IBM FlashSystem 5015 Models 2072-2N2 and 2072-2N4**
Operating environment	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 at: ibm.com/systems/support/storage/config/ssic	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 at: ibm.com/systems/support/storage/config/ssic
ISV solutions	For a list of high-quality solutions with IBM partner ISVs, including access to solution briefs and white papers, contact your IBM representative or Business Partner.	For a list of high-quality solutions with IBM partner ISVs, including access to solution briefs and white papers, contact your IBM representative or Business Partner.

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. FlashSystem solutions, customized for entry enterprise, midrange enterprise, and high-end enterprise, are specifically designed to deliver performance in streamlined packages that are easy to deploy, easy to manage, and easy to grow.

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.

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