Tri-Delta Resources

Redbooks
ibm.com/redbooks

IBM FlashSystem 5000 and 5200 for Mid-Market

Aldo Araujo Fonseca

Storage

IBM

Redguide

IBM FlashSystem 5015, 5035, and 5200

The IBM® FlashSystem® 5015, 5035, and 5200 help you meet the challenges of rapid data growth while staying within limited IT budgets.

These systems allow you to quickly consolidate, simplify, and optimize your IT infrastructure with an efficient, highly flexible, yet easy-to-use storage system with powerful virtualization features.

This IBM Redpaper™ publication is intended for mid-market clients.

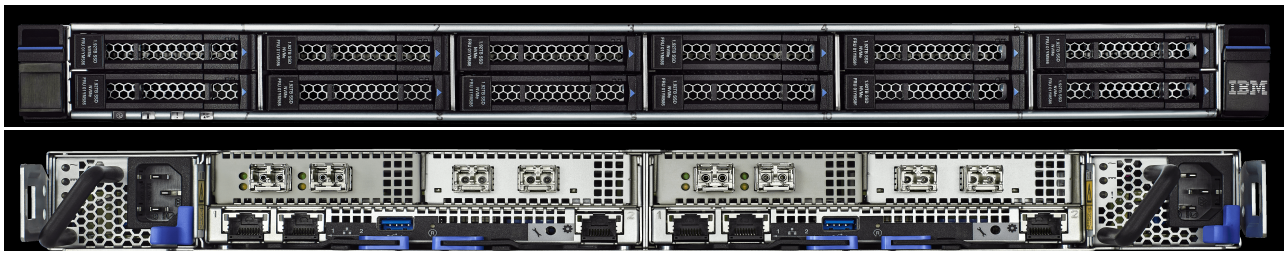


Figure 1 IBM FlashSystem 5200 front view (top) and rear view (bottom)

IBM FlashSystem 5015, 5035, and 5200 are affordable, high-performance storage solutions that are easy to use and grow. They are designed for businesses of all sizes including small, remote, and branch offices and regional and enterprise clients. They are a smarter, self-optimizing solution that requires less management, which enables organizations to overcome their storage challenges.

Midrange workloads: IBM FlashSystem 5015, 5035, and 5200 offer the performance, functionality, and cost-efficiency that is demanded by midrange workloads.

Advanced capabilities

IBM FlashSystem 5015. 5035, and 5200 deliver advanced capabilities. Designed to provide organizations with the ability to consolidate and share data at an affordable price, these systems offer advanced enterprise software capabilities that until now were found only in more expensive systems. Consider the following points:

- IBM FlashSystem 5015, 5035, and 5200 are software-defined storage systems that are built with IBM Spectrum® Virtualize software and designed to consolidate workloads into a single storage system for ease of management and use. These systems reduce costs, and feature highly scalable capacity, high performance, and availability.
- IBM FlashSystem 5015 and 5035 offer the performance, functionality, and cost-efficiency that is demanded by entry and midrange workloads.
- The FlashSystem 5035 adds CPU power and other enterprise features, such as data reduction, high availability configurations, and data-at-rest encryption. Hosts can attach by using SAS, 16 Gb Fibre Channel, or iSCSI.
- IBM FlashSystem 5200 provides greater functionality, including end-to-end
- NVMe-accelerated performance, IBM FlashCore® Module technology unique and Storage-Class Memory (SCM) drives for ultra-low latency.
- All of these systems support concurrent migration from your existing storage. In addition, FlashSystem 5200 supports external storage virtualization for over 500 storage systems from IBM and others, which enables storage consolidation and simplification through improved cross-system consistency.

These affordable storage solutions offer a wide range of enterprise-grade features that can easily evolve as your business grows. Reliable and fast data access is critical for running your business. Whatever the application, your data must be available, secure, and flexible for fast analysis and processing.

IBM FlashSystem 5015, 5035, and 5200 highlights

In this section, we highlight the key features of the IBM FlashSystem® 5015, 5035, and 5200 solutions.

IBM FlashSystem 5015

IBM FlashSystem 5015 offers the following key features:

- Virtualization of internal storage
- 3-site replication
- Local and remote replication (snapshots, disaster recovery, and copy and migrate to cloud)
- IBM Easy Tier® AI-driven automated tiering
- Transparent data migration
- VMware and Red Hat OpenShift container integration

IBM FlashSystem 5035

In addition to the features of IBM FlashSystem 5015, IBM FlashSystem 5035 offers the following features:

- Data reduction (compression and deduplication)
- Scale-out clustering
- IBM HyperSwap® high availability
- Encryption

IBM FlashSystem 5200

Choose IBM® FlashSystem 5200 to accelerate entry and mid-range workloads. It includes the following advanced functions:

- Bring NVMe-accelerated storage performance and new levels of affordability starting small and grow as your business requires.
- Flexible drive support including FCM and SCM drives.
- Deploy cost-efficient, high-performance, compact 1U IBM FlashSystem for any workload.
- Leverage the power of IBM Spectrum® Virtualize for rich enterprise data services. Extend wide-ranging data services across hundreds of external systems.
- FCM 2.0 using IBM QLC technology with latency as low as 70 µs which helps remove bottlenecks in client´s workloads and gives the possibility to combine capacity up to 38.4TB per FCM with durability up to 7 years with FlashWatch guarantee.

IBM FlashSystem family specifications

The specifications of the IBM FlashSystem family are shown in Figure 2 on page 4.

	FlashSystem 5015	FlashSystem 5035	FlashSystem 5200
Software	IBM Spectrum Virtualize	IBM Spectrum Virtualize	IBM Spectrum Virtualize
Max physical capacity raw in a single control enclosure	Up to 656TB	Up to 656TB	Up to 420TB raw or 1PB*
Max usable effective capacity raw in 2U control enclosure	Up to 656TB	Up to 656TB or 1.8PB**	Up to 840TB raw or 2.3PB*
Max capacity with clustering	NA	32PB (2-way)	32PB (4-way)
Internal Virtualization	Yes	Yes	Yes
Thin Provisioning	Yes	Yes	Yes
Data Migration	Migration Only	Migration Only	Licensed by SCU
FlashCopy snapshots	Activation key required	Activation key required	Included
Remote Mirroring	Activation key required	Activation key required	Included
Easy Tier	Activation key required	Activation key required	Included
Encryption - Internal & External	Not supported	Internal only	Activation key required
Compression	--	DRP (32G per system)	DRP (64G per system)
Deduplication	--	63G per system	Min of 256 per system
HyperSwap	--	Requires Remote Copy License	Included
Max IO groups	1	2	4
All-Flash and/or Hybrid	AF - H	AF - H	AF - H
Max cache per System	64GB	64GB	512GB
Host adapter slots per System	2	2	4
Storage Class Memory Support	--	--	Yes
NVMw SSDs and IBM FCMs	--	--	Yes
SAS devices	Yes - Control & Expansion	Yes - Control & Expansion	Yes - Expansion
Data Reduction	--	Software DRP	FCM (No Impact) DRP (HW Assist)
Installation and support	Custormer set-up	Custormer set-up	Custormer set-up Storage Expert Care
Support for CSI and other multicloud	Yes	Yes	Yes

Figure 2 FlashSystem 5015, 5035, and 5200 specifications

*FCM2 38.4TB plus Hardware based Compression 2:1 plus thin provisioning of 50%

**Flash drive 30.72TB plus Data Reduction Pool plus thin provisioning of 50%

Reduce complexity with one storage platform: IBM FlashSystem

For years, storage vendors introduced multiple platforms, each addressing specific requirements. These platforms add complexity because each one is different, with different APIs, management and troubleshooting tools, as well as access to the cloud. And this is for only a single vendor.

Single platform: IBM FlashSystem 5015, 5035, and 5200 deliver entry-level, enterprise solutions at a midrange price.

In addition, data can transparently move back and forth to hybrid cloud environments by taking advantage of IBM Spectrum Virtualize for Public Cloud.

Using the rich functionality that is provided by the IBM FlashSystem platform, clients can easily configure, secure, and manage their environment (see Figure 3).

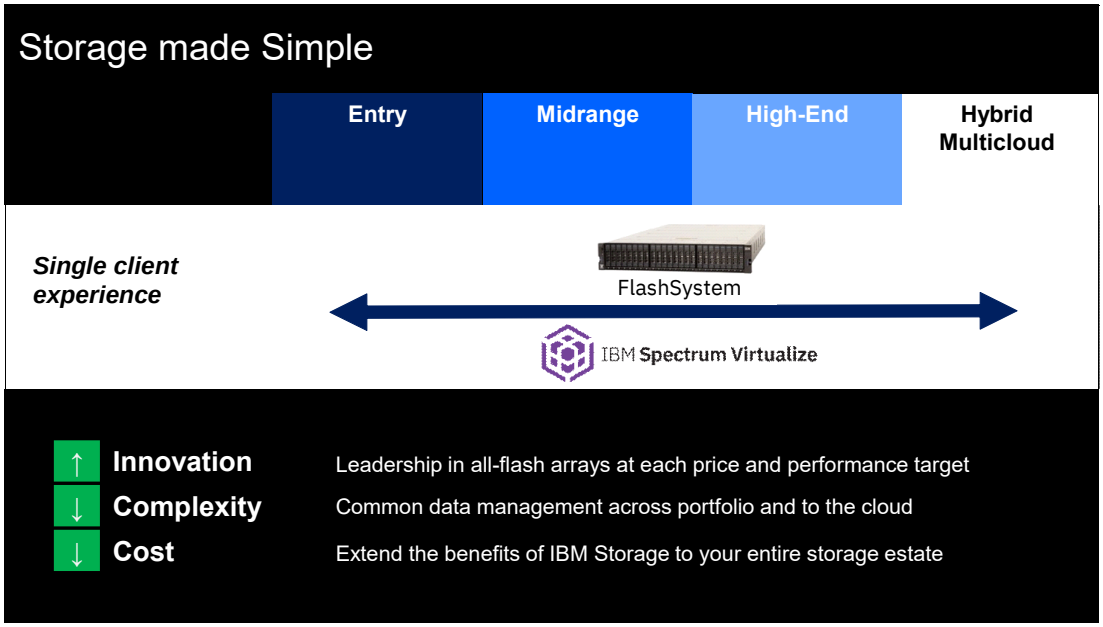


Figure 3 Simplify storage complexity

The IBM FlashSystem family can be used as persistent, highly available storage in Red Hat OpenShift and other container environments. This feature improves flexibility, simplifies deployment, and lowers costs.

FlashSystem is proven and dependable. More than 200,000 systems are running IBM Spectrum Virtualize, managing more than 14.6 exabytes of data[1] and delivering *six nines* (99.9999%) of availability.

[1] Based on IBM internal measurements – January 2021.

Reduce footprint, complexity, and overhead

The business solution features and benefits are listed in Table 1.

Table 1 Business solution features and benefits

Business need	Reduce space and operational costs.
Solution	IBM FlashSystem 5200 offers latency less than 70 microseconds for optimal application performance, as much as 1.7 PB of data capacity in only 1 rack unit, data reduction options for reduced OPEX, CAPEX, HyperSwap high availability technology, and 3-site replication for enhanced business continuity. In addition, this system has the ability to cluster, scale capacity and performance to many petabytes and hundreds of thousands of input/output operations per second (IOPS).
Benefits	Save on: ► Capital expenditures ► Operational expenditures ► Valuable rack and floor space ► Power and cooling cost

IBM Spectrum Virtualize software that is included with the IBM FlashSystem family enables you to optimize storage and maximize efficiency, dramatically reducing costs, floor space, time, time and freeing up staff and increasing productivity.

IBM Spectrum Virtualize includes the following components:

- Data Resilience

  Provides enterprise-grade availability and data security features that include nondisruptive data migration and remote mirroring using IBM HyperSwap technology, plus six nines availability and hardware accelerated. These systems are designed for high availability, with no single point of failure (SPOF), enterprise-proven control software, and non-disruptive maintenance.

- IBM Easy Tier

  IBM Easy Tier provides automatic nondisruptive migration of the most frequently accessed data to the highest performing storage tier while moving less active data to lower performing and less costly storage. No user action is needed because Easy Tier uses AI technologies to recognize data use patterns. By servicing most of the application workload from the fastest storage, Easy Tier accelerates application performance and improves cost efficiency.

- Data Reduction Pools

  Data reduction pools increase usable capacity by up to five times with sophisticated compression and deduplication technologies[2]. When combined with storage virtualization, data reduction pools can increase the effective capacity of existing storage, extending its life and further reducing costs.

  In addition, SCSI UNMAP support automatically frees storage space when servers delete data.

  The benefits of data reduction include reduced acquisition cost, reduced space, and lower power and cooling costs throughout the system lifetime.

[2] From IBM FlashSystem 5035 on.

Easy to manage with cloud-based IBM Storage Insights

The features and benefits of IBM Storage Insights are listed in Table 2.

Table 2 IBM Storage Insights features and benefits

Business need	Ease and simplicity of monitoring, managing, and supporting storage systems.
Solution	IBM Storage Insights is a cloud-based, AI-driven storage management solution that provides a unified view of your storage environment with key capacity and performance information, planning, reporting, alerts, and streamlined support access. IBM Storage Insights offer best practices for monitoring and managing the clients' storage environments. The service collects approximately 23 million data points per day from each storage system and works to predict and prevent issues before they affect business.
Benefits	Understand how your systems are operating and performing, and plan for the future. With IBM Storage Insights, approximately 66% of issues are resolved automatically, and when support is needed, a 40% faster action plan after opening a ticket, resulting in faster resolution.

Cloud-based IBM Storage Insights provides a single dashboard that gives you a clear view of all of your IBM block storage (see Figure 4). You can make better decisions by seeing trends in performance and capacity. With storage health information, you can focus on areas that need attention. IBM Storage Insights provides a clear view of your environments without the need to install or maintain complex software.

Figure 4 Storage Insights dashboard

What’s next: Where to get help

The IBM FlashSystem family is simple, but sophisticated. IBM FlashSystem 5015, 5035, and 5200 bring enterprise features and functions to smaller, mid-market businesses, such as yours.

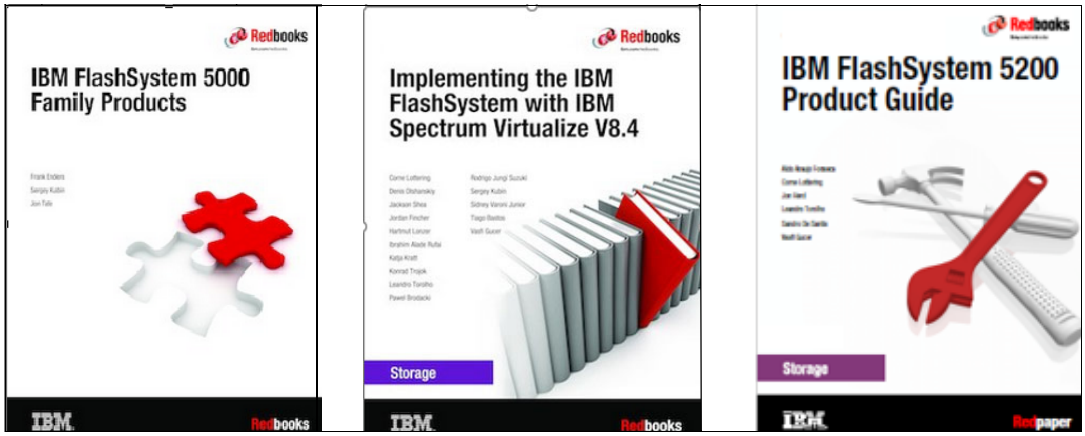
The IBM FlashSystem family is fast, efficient, easy, resilient, and flexible. Everything is simple from configuration, management, and security to support and the use of IBM Storage Insights. The platform also is scalable, tiers easily, and moves data seamlessly. It also is integrated with other application layers, such as containers, VMware, or Hyper-V, and is easy to protect and upgrade.

With the help of IBM and its Business Partners, you can get everything that you need for operations in a single innovative platform that meets all of your storage needs.

Resources for more information

For more information about the concepts that are highlighted in this paper, see the following publications:

- *IBM FlashSystem 5000 Family Products*, SG24-8449
- *Implementing the IBM FlashSystem with IBM Spectrum Virtualize V8.4*, SG24-8492
- *IBM FlashSystem 5200 Product Guide*, REDP-5617



For more information or for answers to questions, contact your IBM Business Partner.

Author

Aldo Fonseca is a Senior Storage Specialist working at IBM Brazil, where he has over 12 years of service. He is skilled in multiple vendors of block-level and file-level storage systems and technologies. With strong knowledge in Server Architectures (Intel and Unix Platforms) his expertise include planning, configuring, and troubleshooting Storage and Hybrid/Private Cloud environments.

Thanks to the following people for their contributions to this project:

Jerry D Baldock, John Blase, Maria Antonieta Altamirano Borrego, Laura Haft Brody, Mary J Connell, Bertrand Dufrasne, Vasfi Gucer
IBM USA

Jorge Escalante
IBM Mexico

Kim Gregers
IBM Denmark

Now you can become a published author, too!

Here's an opportunity to spotlight your skills, grow your career, and become a published author—all at the same time! Join an ITSO residency project and help write a book in your area of expertise, while honing your experience using leading-edge technologies. Your efforts will help to increase product acceptance and customer satisfaction, as you expand your network of technical contacts and relationships. Residencies run from two to six weeks in length, and you can participate either in person or as a remote resident working from your home base.

Find out more about the residency program, browse the residency index, and apply online at:

ibm.com/redbooks/residencies.html

Stay connected to IBM Redbooks

- Look for us on LinkedIn:

  http://www.linkedin.com/groups?home=&gid=2130806

- Explore new Redbooks® publications, residencies, and workshops with the IBM Redbooks weekly newsletter:

  https://www.redbooks.ibm.com/Redbooks.nsf/subscribe?OpenForm

- Stay current on recent Redbooks publications with RSS Feeds:

  http://www.redbooks.ibm.com/rss.html

Notices

This information was developed for products and services offered in the US. This material might be available from IBM in other languages. However, you may be required to own a copy of the product or product version in that language in order to access it.

IBM may not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

IBM may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not grant you any license to these patents. You can send license inquiries, in writing, to:
IBM Director of Licensing, IBM Corporation, North Castle Drive, MD-NC119, Armonk, NY 10504-1785, US

INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some jurisdictions do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Any references in this information to non-IBM websites are provided for convenience only and do not in any manner serve as an endorsement of those websites. The materials at those websites are not part of the materials for this IBM product and use of those websites is at your own risk.

IBM may use or distribute any of the information you provide in any way it believes appropriate without incurring any obligation to you.

The performance data and client examples cited are presented for illustrative purposes only. Actual performance results may vary depending on specific configurations and operating conditions.

Information concerning non-IBM products was obtained from the suppliers of those products, their published announcements or other publicly available sources. IBM has not tested those products and cannot confirm the accuracy of performance, compatibility or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.

Statements regarding IBM's future direction or intent are subject to change or withdrawal without notice, and represent goals and objectives only.

This information contains examples of data and reports used in daily business operations. To illustrate them as completely as possible, the examples include the names of individuals, companies, brands, and products. All of these names are fictitious and any similarity to actual people or business enterprises is entirely coincidental.

COPYRIGHT LICENSE:

This information contains sample application programs in source language, which illustrate programming techniques on various operating platforms. You may copy, modify, and distribute these sample programs in any form without payment to IBM, for the purposes of developing, using, marketing or distributing application programs conforming to the application programming interface for the operating platform for which the sample programs are written. These examples have not been thoroughly tested under all conditions. IBM, therefore, cannot guarantee or imply reliability, serviceability, or function of these programs. The sample programs are provided "AS IS", without warranty of any kind. IBM shall not be liable for any damages arising out of your use of the sample programs.

Trademarks

IBM, the IBM logo, and ibm.com are trademarks or registered trademarks of International Business Machines Corporation, registered in many jurisdictions worldwide. Other product and service names might be trademarks of IBM or other companies. A current list of IBM trademarks is available on the web at “Copyright and trademark information” at http://www.ibm.com/legal/copytrade.shtml

The following terms are trademarks or registered trademarks of International Business Machines Corporation, and might also be trademarks or registered trademarks in other countries.

Redbooks (logo)  ®	IBM®	IBM Spectrum®
Easy Tier®	IBM FlashCore®	Redbooks®
HyperSwap®	IBM FlashSystem®	Redpaper™

The following terms are trademarks of other companies:

Intel, Intel logo, Intel Inside logo, and Intel Centrino logo are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.

OpenShift, Red Hat, are trademarks or registered trademarks of Red Hat, Inc. or its subsidiaries in the United States and other countries.

VMware, and the VMware logo are registered trademarks or trademarks of VMware, Inc. or its subsidiaries in the United States and/or other jurisdictions.

Other company, product, or service names may be trademarks or service marks of others.

REDP-5630-00

ISBN 0738459461

Printed in U.S.A.