



Highlights

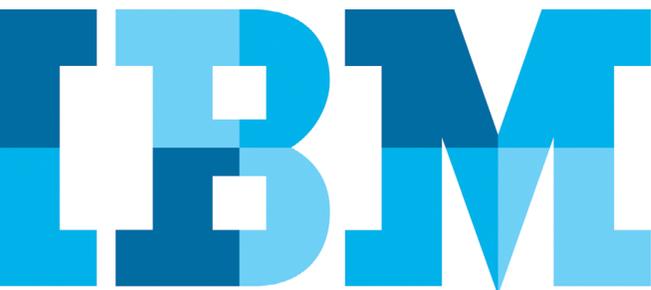
- Accelerate business-critical applications with Non-Volatile Memory Express (NVMe)-optimized IBM® FlashSystem® 9100 all-flash storage arrays
 - Transform IT infrastructure while increasing return on investment (ROI) by extending the power of IBM Spectrum Virtualize™ across all managed systems and into the public cloud
 - Leverage the power of IBM Spectrum™ Copy Data Management and IBM Spectrum Protect™ Plus to increase system efficiency, data protection and business value
 - Optimize storage efficiency and enhance customer experience with IBM Storage Insights powered by artificial intelligence (AI)
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Multiplying the value of data

The Data Reuse, Protection and Efficiency solution helps multiply the value of your data assets

Business produces data. Every transaction, every item sold, every web page viewed by a potential customer generates information. In the past, data from business activity was often discarded or, at best, archived. Now, executives understand that data can offer great business value and competitive advantage after its original use. Data can be reused, often many times, and through each reuse it produces more and more value for the enterprise.

Even copies made for data protection and backup purposes for disaster recovery are forms of data reuse. And of course, existing data sets generated by business applications are reused for testing and validation purposes by development teams fixing bugs and building new applications. And mining data assets for business insight has become so valuable that nine out of 10 executives consider the ability to garner insight from data vital to their companies' very future.¹



Systems Hardware

Solution Brief

IBM FlashSystem 9100 all-flash arrays leverage the ultra-low latency of NVMe and IBM FlashCore® technologies to produce very high-performance data-storage systems. This foundation of NVMe-optimized flash is deeply integrated with several market-leading IBM Spectrum Storage™ software-defined solutions to provide a wide range of data services and multi-cloud capabilities. The systems then add cloud-based system optimization and support enhanced by AI. To further increase the functionality and value that IBM FlashSystem 9100 deployments can provide enterprises of all types and sizes, IBM offers multiple validated solution designs that can easily be added to the baseline IBM FlashSystem configuration. One of these—the *IBM FlashSystem 9100 Solution for Data Reuse, Protection and Efficiency*—is designed specifically to facilitate data protection and data reuse, and to help data-driven organizations unlock the added value potential of their data assets.

The IBM FlashSystem 9100 Solution for Data Reuse, Protection and Efficiency can substantially increase storage efficiency while simplifying data-reuse processes. It multiplies data protection options and capabilities, both on-premises and in the public cloud. Most importantly, leveraging the power of IBM Spectrum Virtualize and the performance of NVMe-optimized flash, the solution can help you increase the value and productivity derived from your data assets.

The foundation: IBM FlashSystem 9100

IBM FlashSystem 9100 provides the foundation for the IBM FlashSystem 9100 Solution for Data Reuse, Protection and Efficiency. The new storage arrays integrate the performance and efficiency of flash and NVMe with the reliability and innovation of IBM FlashCore technology and the rich feature set of IBM Spectrum Virtualize.

IBM FlashSystem 9100 provides a comprehensive storage solution to address the full range of 21st-century business challenges. It provides very high performance, microsecond latency and literally petabytes of capacity in an efficient enclosure. The systems offer simplified infrastructure modernization pathways and enable a range of multi-cloud architectures. Powerful storage efficiency and data reduction features can help lower costs. Validated blueprints can help reduce deployment risks. And AI-enhanced, cloud-based system monitoring and optimization help ensure that IBM FlashSystem 9100 solutions provide outstanding business value.

The all-flash arrays come in two basic models—IBM FlashSystem 9110 and IBM FlashSystem 9150. Both models feature dual controller canisters, dual power supplies and redundant cooling. The systems can provide multiple petabytes of effective data storage in a very efficient two-rack-unit chassis. A key innovation involves the transformation of IBM FlashCore technology into 2.5-inch IBM FlashCore modules (FCMs) with NVMe interfaces, so that 24 FCMs or industry-standard NVMe flash drives can form the basis of the storage array.

IBM FlashSystem 9100 systems leverage the advantages of IBM FlashCore-enhanced 3D triple-level cell (TLC) storage media that provides greater flash density and storage capacity than multi-level cell (MLC) solutions. Along with the move to 3D TLC flash, the purpose-engineered FCMs utilize innovative data reduction pool (DRP) technology that includes deduplication and hardware-accelerated compression, plus SCSI UNMAP support and all the thin provisioning, copy management and efficiency you'd expect from IBM Spectrum Virtualize-based storage. The FCMs also support FIPS 140-2 Level 1 encryption with IBM Security Key Lifecycle Manager centralized key management and full hot-swap capabilities.

Market-leading data services through IBM Spectrum Virtualize

IBM Spectrum Virtualize provides the data-services foundation for every IBM FlashSystem 9100 solution. Its industry-leading capabilities include a wide range of data services that can be extended to over 440 IBM and non-IBM heterogeneous storage systems: automated, policy-driven data movement; synchronous and asynchronous copy services; high-availability configurations; storage tiering; and data reduction technologies, among many others. IBM FlashSystem 9100 solutions can function as IT infrastructure modernization and transformation engines, thanks to capabilities that allow you to extend IBM Spectrum Virtualize data services and functionality to existing external heterogeneous storage systems, reducing both capital and operational expenses while helping to increase the return on your investments in legacy infrastructure.

The Spectrum Virtualize technology within IBM FlashSystem 9100 arrays offers powerful DRP capabilities that include block deduplication that works across all of the storage in each designated DRP and stores just one copy of a given unit of data, and hardware-accelerated data-compression technology that provides consistent, high-performance results across application workloads. The DRPs use a log-structured design built on top of the efficient, distributed RAID 6 provided by IBM FlashCore technology. IBM FlashSystem 9100 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 can waste capacity. The data reduction capabilities work with many operating environments, including VMware, Microsoft Hyper-V, Microsoft Windows and more.

AI-powered customer support through IBM Storage Insights

As any storage administrator knows, managing large storage environments requires many hours of monitoring, analysis, decision-making and adjustment. Then, when problems arise, analyzing complex storage infrastructure and implementing the most effective solutions can be labor-intensive. To address these challenges and reduce both manual labor and mistakes, IBM FlashSystem 9100 solutions come with Storage Insights, an enterprise-proven, AI-enhanced, cloud-based platform that helps you better understand trends in storage capacity and performance and implement best practices. Storage Insights monitors the health, capacity and performance for all IBM block storage and external storage under management through a single user interface, helping IBM customers understand and plan storage capacity and performance. The program provides proactive best practices and uses AI-based analytics to help identify potential issues before they become problems. When support is needed, Storage Insights helps speed resolution by simplifying opening tickets, automating log uploads to IBM, and providing configuration, capacity and performance information to IBM technicians. The cloud-based solution helps enterprises:

- Keep an eye on storage health, performance and capacity across the entire storage environment
- View 70+ metrics over years to see trends and compare them against best practices to identify anomalies before they impact applications
- Speed issue resolution through proactive analysis and reporting
- Enjoy enhanced user experience, high systems availability and the confidence of services delivered from one of the world's leading cloud environments with Storage Insights

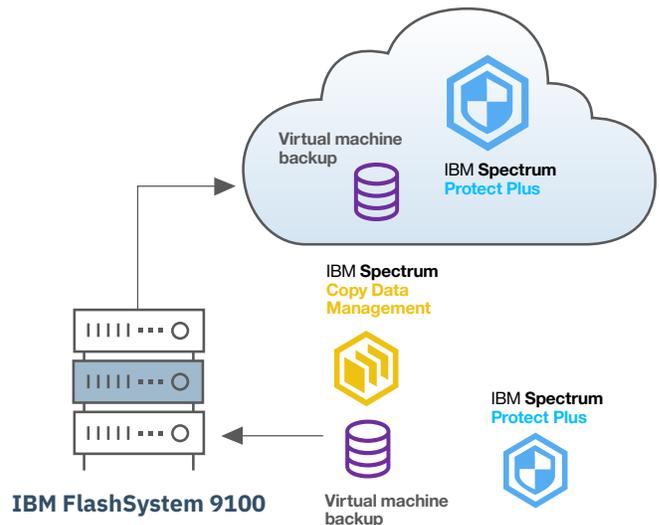
A solution that keeps on giving

The IBM FlashSystem 9100 Solution for Data Reuse, Protection and Efficiency is an optional and separately licensed offering that allows the use of IBM Spectrum Copy Data Management and IBM Spectrum Protect Plus as part of your IBM FlashSystem 9100 solution. Used together, these components provide powerful data reuse, protection, efficiency and multi-cloud capabilities. The solution includes:

- A validated solution deployment blueprint to simplify implementations and lower risks
- Storage efficiency and data-reuse functionality provided by IBM Spectrum Copy Data Management
- Leading-edge data-protection and reuse capabilities on-premises and in the public cloud for virtual and physical applications, provided by IBM Spectrum Protect Plus
- The cloud-based, AI-powered system-optimization program Storage Insights

The IBM FlashSystem 9100 Solution for Data Reuse, Protection and Efficiency enables you to protect and reuse data for maximum business advantage while minimizing storage capacity requirements. With it, you can:

- Back up data in virtual or physical environments using modern data protection capabilities
- Reuse backup and other data copies for DevOps, analytics, reporting and disaster recovery, among many other use cases
- Orchestrate copies to maximize use of snapshots and system efficiency
- Leverage flash performance to help meet your service-level objectives



IBM Spectrum Copy Data Management

Copies can account for more than 60 percent of the data in today's IT infrastructure.² You may be storing unneeded or unused data copies on flash storage, certainly not a good strategy for maximizing the benefits or economics of flash. IBM Spectrum Copy Data Management can help change this equation. As part of the IBM FlashSystem 9100 Solution for Data Reuse, Protection and Efficiency, IBM Spectrum Copy Data Management enables you to significantly improve overall data economics by creating the most efficient storage environments possible. It provides leading-edge copy management services that can simplify copy management and help accelerate business agility and while lowering storage capacity requirements and facilitating data reuse.

Systems Hardware

Solution Brief

IBM Spectrum Copy Data Management makes copies available to data consumers when and where they need them, without creating unnecessary copies or leaving unused copies on valuable flash storage. It catalogs copy data from across your local and off-site cloud infrastructures; identifies duplicates; and compares copy requests to existing copies. This ensures that the minimum number of copies are created to service your various business and data reuse needs. Copy processes and work flows are automated to ensure consistency and reduce complexity. Data consumers can use the self-service portal to create the copies they need when they need them, enabling business agility.

IBM Spectrum Copy Data Management is designed to leverage the copy services within an enterprise's existing storage and hypervisor infrastructure. It enables visibility into copy data in almost any storage environment and provides rapid, self-service data access for data reuse, Test/Dev, business analytics and much more. The solution runs out-of-band to create an actionable catalog of all storage, application and VMware environments. The resulting catalog provides IT administrators with the ability to manage, orchestrate and analyze data in order to unleash its power and meet business demands.

IBM Spectrum Protect Plus

The IBM Spectrum Protect Plus component of the IBM FlashSystem 9100 Solution for Data Reuse, Protection and Efficiency provides data reuse and data protection capabilities for both physical servers and virtual environments. It can also support disaster recovery from backups and data copy use cases such as provisioning DevOps environments and supporting analytics and reporting. The solution offers faster time to value because it can be up and running in as little as an hour, compared to some alternatives that may take weeks to deploy and require costly professional services.

The solution creates and maintains a global catalog of all copies of virtual machines, applications and files, enabling administrators to see just what is protected—and more importantly, what isn't. When the need to recover arises, the global catalog helps administrators quickly identify exactly what they want to use/access, instead of browsing through hundreds of objects and multiple point-in-time copies. Then IBM Spectrum Protect Plus allows instant access and restore from the catalog so that administrators can take what they need to restore operations in a matter of minutes. IBM Spectrum Protect Plus recoveries can be used to restore operations in virtually any data-loss scenario, whether it's a system locked by ransomware, inadvertent data deletion through human error, hardware failures, data corruption or any of the many other ways you can lose critical data. And because backups are fast and frequent, you have multiple recovery points to give you better recovery point objectives.

Leading-edge storage monitoring and management with IBM Spectrum Connect

IBM Spectrum Connect is included with every IBM FlashSystem 9100 storage solution. It is designed to simplify multi-cloud deployment across the entire portfolio of IBM storage solutions. IBM Spectrum Connect leverages existing IBM Storage capabilities and empowers storage teams and other stakeholders by enabling provisioning, monitoring, automating and orchestrating of IBM block storage in containerized, VMware and Microsoft PowerShell environments. It manages the application programming interface (API) dialogs for IBM storage systems from one place, providing a single pane of glass for orchestrating between multiple cloud platforms and IBM storage devices. In addition, IBM Spectrum Connect enables the definition of easy-to-consume storage classes, such as by Service Level Agreement or workload, simplifying self-service and providing easy automation of storage provisioning and data reuse.

The benefits of a high-performance data-reuse solution

Enterprises can gain many benefits by adding the IBM FlashSystem 9100 Solution for Data Reuse, Protection and Efficiency to their IBM FlashSystem 9100 deployment, including:

- More value from data assets and greater productivity from business applications and staff thanks to the performance and efficiency of NVMe-optimized flash storage
- Faster, easier and more efficient reuse of data assets thanks to the combination of ultra-low latency storage and highly functional IBM Spectrum Copy Data Management
- Simplified protection and data access of both physical and virtualized applications on-premises and in the cloud
- More multi-cloud data reuse and protection alternatives, thanks to the synergies between IBM Spectrum Virtualize, IBM Spectrum Copy Data Management and IBM Spectrum Protect Plus
- Greater business agility through streamlined use of containers, microservices and powerful data copy management
- Easier IT modernization and transformation with increased return on investment in legacy systems through IBM Spectrum Virtualize technology and data services
- Greater flexibility to deploy applications on private cloud through Kubernetes, containers or traditional virtual machines, while running legacy applications in containers and easily connecting them to off-premises resources
- Higher system availability with multiple disaster-recovery and data-protection options provided through the IBM FlashSystem 9100 Solution for Data Reuse, Protection and Efficiency components
- Lower risk and simplified deployment through validated solution blueprints
- Simplified, more effective and responsive AI-powered customer support

Multiplying the value of data

Though data is now being recognized as a resource, similar to petroleum or gold, it has an advantage over many traditional resources in that data can be used and reused without loss. But to most effectively and efficiently multiply the value of data assets, the right tools must be employed. The Data Reuse, Protection and Efficiency solution for IBM FlashSystem 9100 brings together the speed and efficiency of NVMe-optimized flash storage with a suite of market-leading software-defined components that simplify and facilitate data reuse and protection in traditional, virtual and containerized environments in your data center and across multiple private and public clouds. IBM FlashSystem 9100—a lot of potential, and a world of value, in one small package.

Why IBM?

IBM delivers best-of-breed, enterprise-class storage solutions, whether on-premises, in the cloud, or in a hybrid cloud format. With expertise in all-flash storage and powerful data management tools, IBM helps IT operations efficiently use their storage resources, and helps enable interoperability with a wide range of storage technologies. IBM offers flexibility and experience, and gives business managers the ability to keep operational costs under control and within budget.

For more information

To learn more about IBM FlashSystem 9100 and the IBM FlashSystem 9100 Solution for Data Reuse, Protection and Efficiency, please contact your IBM representative or IBM Business Partner, or visit: ibm.com/us-en/marketplace/flashsystem-9100

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



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Actual available storage capacity may be reported for both uncompressed and compressed data and will vary and may be less than stated.

¹ "Data Mastery: The Global Driver of Revenue," *WSJ Custom Studios*, 2015. <http://www.oracle.com/us/dm/global-executive-study-2618506.pdf?elqTrackId=29943fd7ddd146759a61e4ad0bf85a87&elqaid=35311&elqat=2>

² "Software-defined business agility," *IBM Systems Technical White Paper*, November 2016. <https://www.ibm.com/common/ssi/cgi-bin/ssialias?htmlfid=TSW03511USEN&>



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