Systems Hardware
Solution Brief

Multi-cloud business continuity and data reuse

The Business Continuity and Data Reuse solution takes disaster recovery to the cloud

Highlights

- Accelerate business-critical applications with Non-Volatile Memory Express (NVMe)-optimized IBM® FlashSystem® 9100 all-flash storage arrays
- Move data between on-premises IBM FlashSystem 9100 arrays and the public cloud with IBM Spectrum Virtualize™ for Public Cloud
- Implement disaster-recovery strategies between IBM FlashSystem 9100 and public cloud infrastructure or between public cloud data centers
- Accelerate data reuse and value by running DevOps or analytics in the public cloud with IBM Spectrum™ Copy Data Management
- Optimize efficiency and enhance customer experience with artificial intelligence (AI)-powered IBM Storage Insights

The mission-critical software at the heart of modern enterprises is what lets business happen, from initiating transactions to enabling customer support. For these critical applications, organizations want "always-on," highly-available IT infrastructure solutions that meet their particular business demands, regulatory requirements and disaster-recovery strategies. Because even an hour of downtime means additional operational costs and brings the potential for damaged brand value, recovery point objectives (RPOs) and recovery time objectives (RTOs) for key business data need to be as close to zero as budgets will allow.

Public cloud-based business-continuity solutions offer ways to minimize capital outlays while maintaining the accessibility of precious data. Production data can be stored on-premises to ensure security and improve system performance, while redundant infrastructure with near-zero RTO/RPO can be provisioned in the cloud without capital expense. Market-leading IBM Spectrum Storage™ software-defined solutions offer a number of ways to implement cloud-based business-continuity solutions. Now, IBM offers the *IBM FlashSystem 9100 Solution for Business Continuity and Data Reuse*, based on a low-risk validated blueprint available as software with IBM FlashSystem 9100 all-flash storage systems.

Based on IBM Spectrum Virtualize for Public Cloud and IBM Spectrum Copy Data Management, the IBM FlashSystem 9100 Solution for Business Continuity and Data Reuse enables a programmatic business continuity workflow that can be easily tested to ensure that business

service-level agreements are met. Integration with VMware orchestration software such as VMware Site Recovery Manager provides a complete virtual machine and application-aware business-continuity solution for VMware-based workloads. In addition, the solution provides robust copy management and data reuse functionality that can lower costs, improve business agility, and increase the value of data assets either on-premises or in the public cloud. For the data-driven, multi-cloud enterprise looking to minimize both RTO/RPO and capital outlays by leveraging the power of the public cloud, deploying the IBM FlashSystem 9100 Solution for Business Continuity and Data Reuse offers a validated toolkit for solving one of the most crucial challenges facing 21st-century business.

The foundation: IBM FlashSystem 9100

IBM FlashSystem 9100 integrates the performance and efficiency of flash and NVMe protocol with the reliability and innovation of IBM FlashCore® technology and the rich feature set of IBM Spectrum Virtualize and IBM Spectrum Virtualize for Public Cloud. The arrays provide a comprehensive storage solution to address the full range of 21st-century business challenges. They provide 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 help lower costs. Validated blueprints 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 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 and storage efficiency that enterprises have come to 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, helping to reducing both capital and operational costs while increasing the return on your investments in legacy infrastructure.

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

Containers enable software to be packaged with all the elements needed to run 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. IBM Spectrum Virtualize enables IBM FlashSystem 9100 solutions to become effective components in container environments, helping to improve flexibility, simplify deployment and lower costs.

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 can take advantage of Storage Insights, an enterprise-proven, AI-enhanced, cloud-based system insights 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:

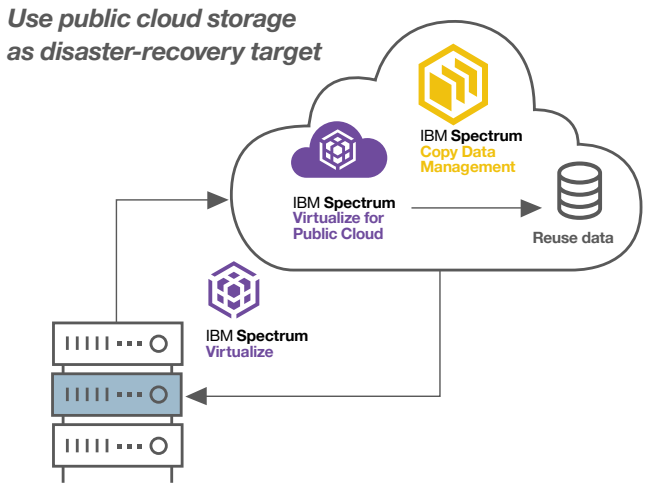
- Keep an eye on storage health, performance and capacity across the entire storage environment
- View 70+ metrics over years to see trends and compare them against best practices to identify anomalies before they impact applications
- Speed issue resolution through proactive analysis and reporting

Storage Insights can help IBM customers enjoy an enhanced user experience, higher systems availability, faster time to resolution of issues and the confidence of services delivered from one of the world's leading cloud providers.

High-performance business continuity

The IBM FlashSystem 9100 Solution for Business Continuity and Data Reuse adds IBM Spectrum Virtualize for Public Cloud and IBM Spectrum Copy Data Management to the baseline IBM FlashSystem 9100 configurations. These components provide powerful business continuity, data-reuse and multi-cloud capabilities. The solution includes:

- A validated solution deployment blueprint to simplify implementations and lower risks
- The technology to implement business continuity utilizing IBM Cloud™ with real-time replication from on-premises IBM FlashSystem 9100 storage through native IBM Spectrum Virtualize IP replication services
- IBM Spectrum Virtualize for Public Cloud which can be deployed on IBM Cloud infrastructure, thus providing the same data services on IBM Cloud that are available on-premises. Data is stored on IBM Spectrum Virtualize for Public Cloud-managed capacity, either on IBM Cloud Endurance or Performance block storage for immediate data reuse
- Storage efficiency and data reuse functionality provided by IBM Spectrum Copy Data Management
- A comprehensive suite of storage management features provided by IBM Spectrum Connect
- And the AI-enhanced IBM customer support program called Storage Insights



The solution enables you to deploy multi-cloud environments for business continuity while also facilitating data reuse to reduce costs and improve business agility. It allows you to:

- Reduce both operating and capital expenses for business continuity by replicating to IBM Cloud
- Leverage cloud disaster-recovery copies for:
  - DevOps
  - Analytics
  - Reporting
- Recover applications in VMware environments in IBM Cloud with near-zero RTO/RPO
- Easily migrate workloads between traditional, private and IBM Cloud environments

The IBM FlashSystem 9100 Solution for Business Continuity and Data Reuse includes a validated comprehensive solution blueprint, which covers the installation and setup of IBM Spectrum Virtualize for Public Cloud, how to configure secure networking between on-premises data centers and the public cloud, and how to set up application-level failover and failback in VMware environments through the use of VMware vMotion and Site Recovery Manager. The blueprint also describes how to leverage disaster-recovery copies for data reuse instances.

Continuity toolkit for the cloud

IBM Spectrum Virtualize and IBM Spectrum Virtualize for Public Cloud together support mirroring between on-premises and cloud data centers or between cloud data centers. These functions can be used to:

- Implement disaster-recovery strategies between on-premises and cloud data centers or between cloud data centers, covering a range of RPO/RTO capabilities, with options approaching zero RPO/RTO
- Enable cloud-based DevOps with easy replication of data from on-premises sources
- Migrate data between on-premises and cloud data centers or between cloud data centers
- Enable cloud-based DevOps with easy replication of data from on-premises sources
- Enhance the performance and functionality of basic IBM Cloud Performance or Endurance block storage with advanced data services such as IBM FlashCopy® and IBM Easy Tier®
- Create scalable solutions in the public cloud through multi-node high-availability clusters utilizing IBM Spectrum Virtualize for Public Cloud that can scale to as high as eight node clusters for maximum performance and availability
- Leverage public cloud environments for on-premises workloads with flash-backed IBM Cloud Performance storage and high-efficiency IBM Cloud Endurance storage options to build a configuration tailored to your specific needs. Add or change storage at any time. Dedicated servers and pre-allocated input/output operations per second (IOPS) for performance storage ensure consistent and dependable performance
- Support virtualized and containerized server environments, including VMware, Hyper-V, IBM PowerVM®, Docker and Kubernetes

Traditional practices that provide data replication simply by copying storage at one facility to largely identical storage at another facility aren't an option where public cloud is concerned. And using conventional software to replicate data imposes unnecessary loads on application servers. IBM Spectrum Virtualize for Public Cloud provides a new solution to combine on-premises and cloud storage for greater flexibility at lower cost across a range of RPO/RTO targets.

Data reuse simplified

As part of the IBM FlashSystem 9100 Solution for Business Continuity and Data Reuse, IBM Spectrum Copy Data Management facilitates data reuse and substantially increases storage efficiency by providing high-performance copy management. Copies can account for more than 60 percent of the data in today's IT infrastructure.[1] 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 by helping create the most efficient storage environments possible. IBM Spectrum Copy Data Management

provides a leading-edge suite of copy management services that can simplify copy management and provide data protection solutions for container environments through its leading-edge snapshot capabilities.

IBM Spectrum Copy Data Management also provides data reuse functionality for data stored in IBM Public Cloud. Data reuse scenarios could include DevOps, reporting, analytics and much more. 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 storage. It catalogs copy data from across your local and off-site cloud infrastructure, identifies duplicates, and compares copy requests to existing copies. Data consumers can use the self-service portal to create the copies they need, enabling business agility. By enabling data reuse on data replicated to the cloud for disaster-recovery purposes, enterprises can gain instant additional business value by putting that replicated cloud data to work.

IBM Spectrum Copy Data Management is a powerful enabler of multi-cloud architectures. It not only helps you move data to the cloud, it enables you to bring up live application environments that can leverage the less expensive, elastic compute infrastructure in the cloud. You can spin up workloads and then spin them back down reliably. This maximizes the economic benefit of the cloud by allowing you to use and pay for only the infrastructure you need.

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. Today's organizations demand easy and fast integration of storage in multiple cloud environments.

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.

The benefits of multi-cloud business continuity

The IBM FlashSystem 9100 Solution for Business Continuity and Data Reuse can help provide a number of important benefits to data-driven enterprises seeking to leverage a multi-cloud architecture to enhance system availability and business resilience, 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
- Lowered costs by storing fewer data copies on valuable, high-performance flash
- Near-zero RPO/RTO thanks to real-time replication capabilities
- Optimized and highly available extension of existing workloads from on-premises data centers to IBM Cloud data centers worldwide
- Minimized capital outlays for cloud-based business continuity
- 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
- More multi-cloud data reuse and protection alternatives, thanks to the synergies between IBM Spectrum Virtualize, IBM Spectrum Copy Data Management and IBM Spectrum Virtualize for Public Cloud

- 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
- Lower risk and simplified deployment through validated solution blueprints
- Simplified, more effective and responsive AI-powered customer support

"Always on" becomes practical

System downtime has become essentially unacceptable in today's business climate. This is especially true for data-driven organizations that are transforming IT infrastructure from traditional maintenance-heavy cost centers into modern engines of innovation and competitive advantage. IBM FlashSystem 9100 was engineered to be a driver of change. By adding the IBM FlashSystem 9100 Solution for Business Continuity and Data Reuse to your new, high-performance storage implementation, you can make the public cloud into a cost-efficient, real-time system recovery tool. With IBM as your technology partner, near-zero downtime isn't just possible—it's practical.

Why IBM?

IBM delivers best-of-breed, enterprise-class storage solutions and storage management solutions, whether on-premises, in the cloud or in a hybrid cloud format. With expertise in all-flash storage and powerful data control tools, IBM helps IT operations efficiently use their storage resources, and helps enable interoperability with a wide range of storage technologies from both IBM and other vendors. 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 Business Continuity and Data Reuse for keeping your organization's data safe and accessible, please contact your IBM representative or IBM Business Partner, or visit: **ibm.com**/us-en/marketplace/flashsystem-9100

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IBM Systems
New Orchard Road
Armonk, NY 10504

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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] "Software-defined business agility," IBM Corporation, November 2016. https://www-01.ibm.com/common/ssi/cgi-bin/ssialias?htmlfid=TSW03511USEN

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