IBM FlashSystem drives high-performance cyber resilience solutions

Highlights

- Deploy IBM FlashSystem for powerful cyber resilience solutions
- Leverage IBM Spectrum Virtualize to build resilient architectures
- Add IBM Spectrum Copy Data Management to increase efficiency

Often, applications exist that are foundational to the operations and success of an enterprise. They demand the highest levels of performance, functionality, security, and availability. To support these mission-critical applications, enterprises of all types and sizes turn to IBM FlashSystem storage solutions.

With its Non-Volatile Memory Express (NVMe)-accelerated architecture and IBM Spectrum Virtualize-driven data management capabilities, IBM FlashSystem has earned a reputation for being one of the fastest, most feature-rich storage families in the marketplace. In fact, the IBM FlashSystem family offers the lowest cost and highest performing storage options on the market today.[1]

Certainly, IBM FlashSystem solutions are well known for accelerating application and business performance and productivity, but perhaps less heralded is the ability of these leading-edge storage arrays to play a foundational role in simplifying and strengthening a crucial business function – *cyber resilience*.

 Cyber resilience refers to the preparations organizations make to deal with cyber threats and vulnerabilities, the defenses that have been developed, and the resources available for mitigating a data security failure after the fact. The IBM Spectrum Virtualize data management functionality provided by IBM FlashSystem solutions can be enhanced by the data movement and efficiency capabilities of IBM Spectrum Copy Data Management to create a very highly resilient IT infrastructure environment that offers a great range of architectural flexibility.

Flexible, resilient storage architectures

IBM FlashSystem data storage solutions can serve as the foundation of a flexible, high-performance, cost-efficient cyber resilience approach to significantly reduce the risk of disruption and financial losses due to user errors, malicious destruction or ransomware attacks. The storage arrays offer many data protection and high-availability features through their use of IBM FlashCore technologies – from leading-edge flash management to complete component redundancy – but the real key to building powerful cyber resilience solutions stems from leveraging the wide-ranging capabilities of the IBM Spectrum Virtualize software that provides the data services for every IBM FlashSystem storage solution. The industry-leading capabilities of IBM Spectrum Virtualize include automated data movement, synchronous and asynchronous copy services (either on-premises or to the public cloud), encryption, high-availability configurations, storage tiering, and data reduction technologies, among many others.

IBM Spectrum Virtualize enables you to extend a broad spectrum of data services and functionality to over 500 IBM and non-IBM external heterogeneous storage systems, reducing both capital and operational costs while increasing the return on your investments in legacy infrastructure.
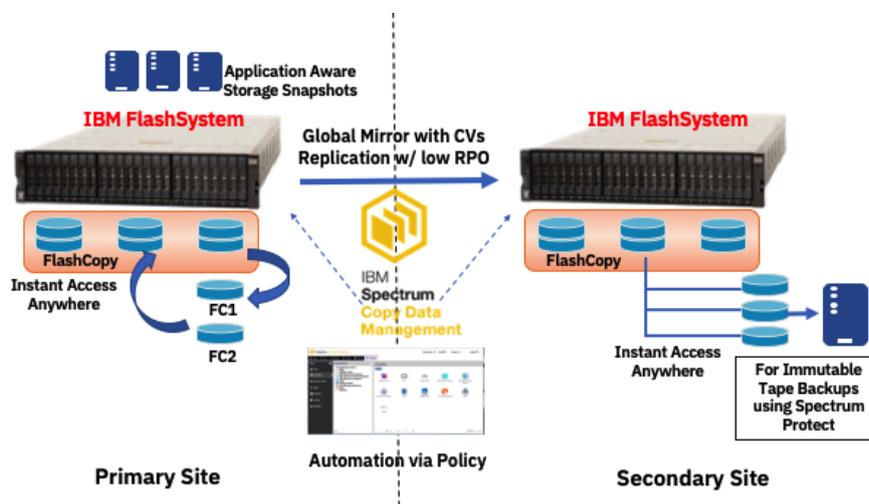
Cyber Resilience Solution IBM FlashSystem and Spectrum CDM

For enterprise-grade business continuity, disaster recovery, and cyber resilience, IBM Spectrum Virtualize offers two site advanced replication and mirroring support based on IBM technologies such as FlashCopy and Metro and Global Mirror and enhanced by the addition of IBM Spectrum Copy Data Management.

IBM Spectrum Virtualize utilizes a technology called IBM FlashCopy to create local space-efficient, point-in-time data copies. FlashCopy can be used to take rapid copies of production data for use as backups or for application development and testing activities, among others. Once they are created, these copies can then be very efficiently managed by IBM Spectrum Copy Data Management software. Importantly, FlashCopy makes "consistent" data copies identical to production data sets at the instant they are created. Consistent copies are used to replicate data sets to backup and recovery solutions physically located away from the production environment.

To achieve recovery time objectives (RTO) approaching zero, where almost no data is lost during system recovery, two IBM FlashSystem solutions can be configured leveraging the capabilities of IBM Spectrum Virtualize and copies made by IBM FlashCopy in a Metro Mirror connection over two sites to synchronously replicate data across metro-area-wide distances. In this configuration, any write to a local Metro Mirror IBM FlashSystem target sends its data to the remote IBM FlashSystem target before the input/output (I/O) operation is acknowledged at the issuing host.

To build effective business resilience and disaster recovery (DR) architectures at greater distances, enterprises can configure multiple IBM FlashSystem solutions in a Global Mirror connection at essentially any distance apart, then asynchronously replicate data across regions. Data is written to the local Global Mirror FlashSystem and the I/O is completed on the local system before that data is sent to the remote system. This approach can achieve very low RTOs while still maintaining cost-efficient and acceptable RPOs.

Metro Mirror and Global Mirror functionality can be combined to achieve three-site replication. A Global Mirror/Metro Mirror replication solution has two systems in a Metro Mirror connection and another remote system at a third site in a Global Mirror connection with one of the Metro Mirror systems. This solution provides both within-region (Metro Mirror) and out-of-region (Global Mirror) DR and business continuity options to meet almost any enterprise requirement.

Global Mirror offers a number of benefits and advantages. For example, Global Mirror with Changed Volumes (GMCV) and Incremental FlashCopy can be used to effectively deploy 3-site replication solutions over low bandwidth networks while reducing any impact on the production environment. GMCV can also guarantee the consistency of data copies, and allows the option to "tune" RPO to meet budget and performance priorities.

Within this powerful, cyber resilient architecture, IBM Spectrum Copy Data Management manages data reuse, as well providing copies for DevOps, reporting, analytics, and much more. IBM Spectrum Copy Data Management makes copies available to data consumers when and where needed, without creating unnecessary copies or leaving unused copies on valuable storage. It catalogs copy data from across local and off-site IT infrastructure, identifies duplicates, and compares copy requests to existing copies. Through its deep integration with IBM Spectrum Virtualize, IBM Spectrum Copy Data Management can create multiple snapshots of data volumes on IBM FlashSystem storage using FlashCopy functionality. Then it can perform

policy-driven instant restores of entire Virtual Machines (VM) using those cataloged snapshots.

Finally, for the ultimate in data protection and cyber resilience, IBM Spectrum Protect and IBM Spectrum Archive can be integrated into the CDM/FlashSystem solution to provide WORM (Write Once/Read Many times) and "air gap" data protection. Because tape cartridges can be physically removed from network connections and literally "stored on the shelf," this technique offers unbeatable isolation of systems.

IBM FlashSystem

IBM FlashSystem storage solutions combine the performance of flash and an NVMe-optimized architecture with the reliability and innovation of IBM FlashCore technology and the rich feature set and high availability of IBM Spectrum Virtualize. Among its many advantages, this powerful family of storage platforms provides:

- The option to use large capacity IBM FlashCore modules with inline-hardware compression, data protection, and innovative flash management features; industry standard NVMe drives; or Storage Class Memory drives

- The software-defined storage functionality of IBM Spectrum Virtualize with a full range of industry-leading data services such as dynamic tiering, IBM FlashCopy management, data mobility, and high-performance data encryption, among many others

- Innovative data reduction pool (DRP) technology that includes deduplication and hardware-accelerated compression technology, plus SCSI UNMAP support and all the thin provisioning, copy management, and efficiency you'd expect from IBM Spectrum Virtualize-based storage.

IBM Spectrum Virtualize

IBM Spectrum Virtualize lies at the heart of every IBM FlashSystem storage solution and has been proven for more than 15 years in the most demanding IT environments. Along with leading-edge data services and multicloud and container-enabling capabilities, IBM Spectrum Virtualize offers a number of features that multiply the cyber resilience options where it is deployed:

- Moving data is one of the most common causes of planned downtime. IBM Spectrum Virtualize enables data movement from one storage system to another, or between arrays, while maintaining access to the data. This function can be used when replacing older storage with newer storage, as part of load-balancing work, or when moving data in a tiered storage infrastructure from disk drives to flash.

- The IBM HyperSwap function supports storage and servers in three data centers. In this configuration, IBM FlashSystem solutions enable servers at each data center to access data

concurrently, with automated switch-over in case of failure. When combined with server data mobility functions such as VMware vMotion or IBM PowerVM Live Partition Mobility, HyperSwap technology enables non-disruptive storage and VM mobility between data centers that can be up to 300 km (186 miles) apart.

- To help drive IT transformation, IBM Spectrum Virtualize for IBM Public Cloud offers multiple ways to create hybrid cloud solutions between on-premises private clouds and the public cloud. It enables real-time storage-based data replication and disaster recovery, as well as data migration between local storage and IBM Cloud. And because of its software-defined storage nature, IBM Spectrum Virtualize allows storage administration at a cloud service provider's site in the same way as on-premises, regardless of the type of storage.

- IBM Spectrum Virtualize enables administrators to apply across all systems under management a single set of advanced network-based replication services that operate in a consistent manner, regardless of the type of storage being used. It supports remote mirroring, enabling organizations to create copies of data at remote locations for disaster recovery. Replication can occur between any systems built with IBM Spectrum Virtualize and can involve any supported storage, including cloud. Support for VMware vCenter Site Recovery Manager helps speed disaster recovery.

- For IP replication, IBM Spectrum Virtualize uses innovative Bridgeworks WANrockIT technology to optimize the use of network bandwidth and can compress data being transmitted to help reduce networking costs and improve remote replica currency.

- The FlashCopy functionality within IBM Spectrum Virtualize creates an almost-instant copy, or "snapshot," of active data that can be used for backup purposes or for parallel processing activities. Up to 256 copies of data may be created. More advanced FlashCopy functions allow operations to occur on multiple source and target volumes. Management operations are coordinated to provide a common, single point in time for copying target volumes from their respective source volumes.

- The Global Mirror function is designed to mirror data between volume pairs of a storage system over greater distances without affecting overall performance. Global Mirror is based on IBM technologies such as Global Copy and FlashCopy. Global Mirror operations periodically invoke a point-in-time FlashCopy at the recovery site without disrupting the I/O to the source volume, thus giving a continuously updating, nearly up-to-date data backup. Then, by grouping many volumes into a session you can copy multiple volumes to the recovery site simultaneously while maintaining point-in-time consistency across those volumes. Global Mirror provides support for virtually unlimited distances between the local and remote sites, enabling you to choose your remote site based on business needs and site separation to add protection from localized disasters.

IBM Spectrum Copy Data Management

IBM Spectrum CDM provides a powerful suite of copy management services that can simplify copy management and provide data protection solutions for multicloud container environments through its leading-edge snapshot capabilities. It leverages the copy services within an enterprise's existing storage and hypervisor infrastructure for visibility into copy data in almost any storage environment and provides rapid, self-service data access for operational use cases, DR, Test/Dev, and business analytics.

The platform easily installs as a VM and catalogs storage, application, and VMware environments without the need to deploy agents. Once installed, IBM Spectrum Copy Data Management 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.

For cyber resilience, IBM Spectrum Copy Data Management enables IT administrators to automate and orchestrate otherwise complex data reuse scenarios for multiple business solutions such as automated DR, Test/Dev, and business analytics. Disaster recovery can be automated so that it can be tested and validated every day.

The power of IBM Spectrum Copy Data Management enables the resources used for these business operations to be brought up in a fenced/segregated environment, promoted to production quickly with the push of a button, or torn down and cleaned up after a test. Orchestration drives repeatability and auditability, allowing enterprises to leverage a single data copy for multiple purposes, reducing data sprawl and helping lower costs.

Copy data is one of the more susceptible vectors by which an organization can experience cyberattacks because it is all-too-often not tracked, sometimes not scrubbed for sensitive data, and not always secured like it should be. Deploying IBM Copy Data Management can help strengthen your copy data security posture by employing robust data masking, and it uses policy and role-based filtering to keep sensitive data away from prying eyes.

Resilient to the core

The IBM FlashSystem family provides leading storage solutions for entry-level, mid-range, and high-end enterprise environments of almost any type and size. Every IBM FlashSystem storage solution includes IBM Spectrum Virtualize technologies that not only provide a wide range of innovative data services, but also enable powerful cyber resilience options and architectures for data protection and fast business recovery.

Adding IBM Spectrum Storage elements such as IBM Spectrum Copy Data Management enhances IBM FlashSystem-driven environments by increasing system efficiency and streamlining many cyber resilience tasks. When combined, this suite of IBM Storage technologies helps create the type of business continuity and cyber resilience solutions that enable 21st century business to thrive.

1
 Silverton Consulting: *IBM FlashSystem Storage and SAN Volume Controller Engine Updates*, February 2020

Why IBM?

IBM Storage for cyber resilience provides end-to-end solutions that can efficiently prevent, detect and respond to cyberattacks as a result of a deep integration between innovative technology and a comprehensive portfolio of software and hardware offerings.

By providing multi-layered security and high resilient functionality, this portfolio can maximize the data protection capabilities to help organizations significantly reduce the risk of business disruption and financial losses due to user errors, malicious destruction or ransomware attacks.

For more information

IBM Storage Lab Services have the expertise and technical consultants to help you turn your business into a cyber resilient organization by providing:

• Cyber resilience storage assessments

• Implementation services

• Post deployment health checks

To learn more, please visit:

https://www.ibm.com/it-infrastructure/services/lab-services/storage