IBM Spectrum Fusion HCI datasheet

Highlights

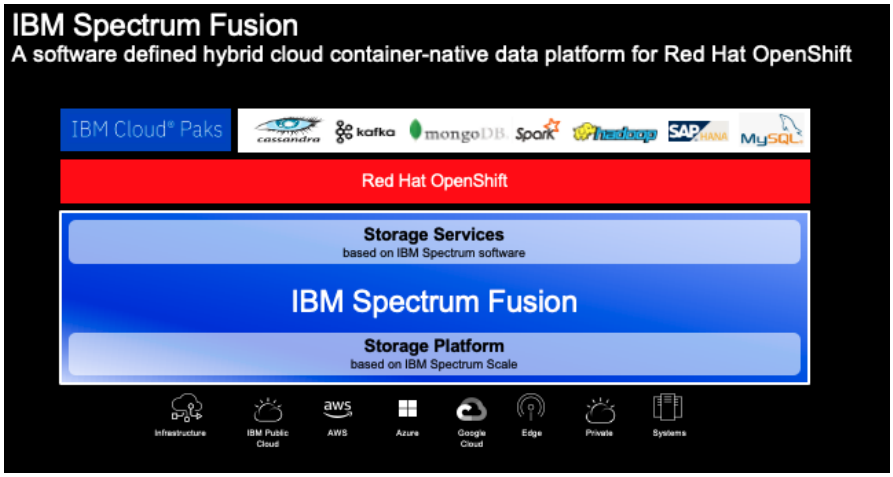
- Faster path to application modernization
- Increase business agility with access to global data
- Accelerate business growth with parallel data access and scalable data
- Simplify the management of an OpenShift solution

Turbocharge your OpenShift infrastructure for AI and hybrid cloud

In a recent study conducted by Forrester Consulting on behalf of IBM in March 2021, 71% of companies said they needed a consistent way to deploy cloud-native applications across on-premises infrastructure and public clouds. As this desire for consistency of applications grow, many customers are turning to the flexibility and capabilities of containers and Kubernetes. In a recent IDC survey (https://www.redhat.com/rhdc/managed-files/st-idc-infrastructure-modernization-challenges-analyst-material-f28911-202106-en_1.pdf) , 41% of companies have deployed containers and 24% cited they will be adding production deployments in the next 12 months. In the same survey, 80% of those using containers are already using them in production.

As these containerized workloads grow, customers need applications and data to adjust and shift in response to dynamic market demands so their organization can become more competitive. Developers and IT staff need diverse and easy to use tools & data services to build and deploy applications anywhere, at any pace, with data that scales dynamically, achieves peak performance, and adheres to security requirements. The business goal is to drive agility throughout the organization and become more flexible for constantly changing market dynamics.

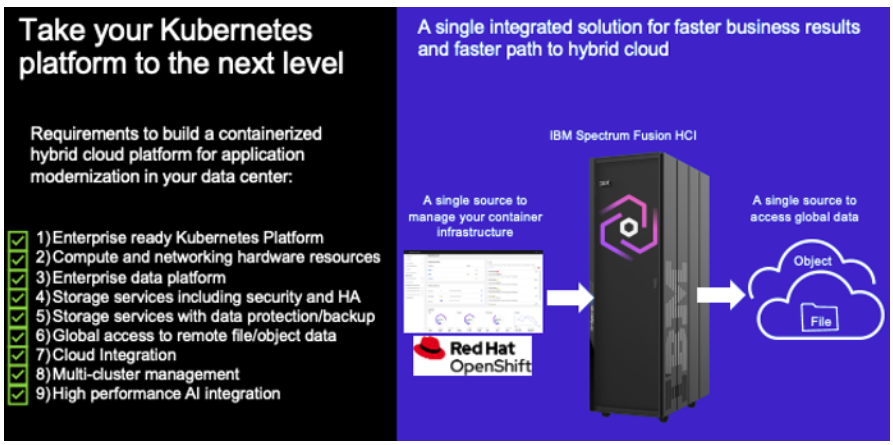
Red Hat OpenShift is a clear leader for container native and cloud native applications and IBM has created a solution to make OpenShift even more powerful.



IBM Spectrum Fusion

IBM Spectrum® Fusion a container-native comprehensive global data platform for OpenShift. This innovative solution is built with the essential elements necessary for mission critical containers and the hybrid cloud. Our solution includes data services that are critical for global enterprise applications and a data driven Red Hat OpenShift environment.

HCI (Hyper-Converged Infrastructure) is a popular implementation of infrastructure which combines servers, storage and network into composable software defined building blocks. Instead of traditional separation of compute, network and storage resource, HCI offers a simplified and unified management constructure for all the resources (compute, network and storage) as well as a hyper-converged software layer for the storage platform and storage resources. Simplification of the management and the data layer are key attributes of the modern HCI.



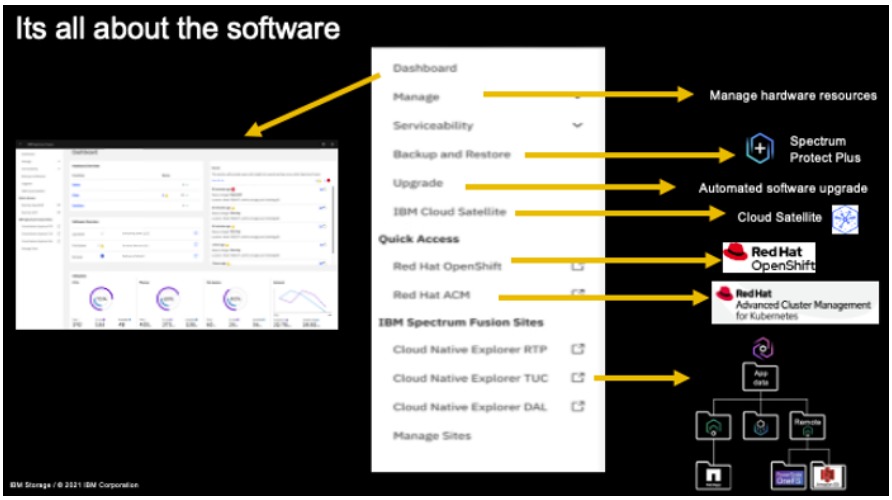
IBM Spectrum Fusion HCI

IBM Spectrum® Fusion HCI is a fast and easy way to deploy IBM Spectrum Fusion with an optimized hardware configuration. This solution is built with a storage platform that includes the essential elements necessary for mission critical containers and the hybrid cloud with storage services built for enterprise applications and Red Hat OpenShift. Our fully containerized software provides the necessary components for a true hybrid cloud data experience.

IBM Spectrum Fusion HCI comes pre-built from factory ready to run your containerized workloads with resources that can be optimized for multiple data centric and AI applications. Our solution is ready to tackle the most demanding modern workloads with our innovative hardware and software solution.

- Delivers faster path to application modernization with an integrated hardware and software platform designed to help customers deploy Red Hat OpenShift faster
- Increase business agility with access to global data resources on the edge, in the data center or in the cloud
- Accelerate business growth with parallel data access, AI optimized resources, and scalable data that can span from edge to core to cloud
- Simplify the management of an OpenShift HCI solution with hyperconverged data and a single dashboard to manage local OpenShift resources and remote data resources

IBM Spectrum Fusion HCI is all about the software



The software

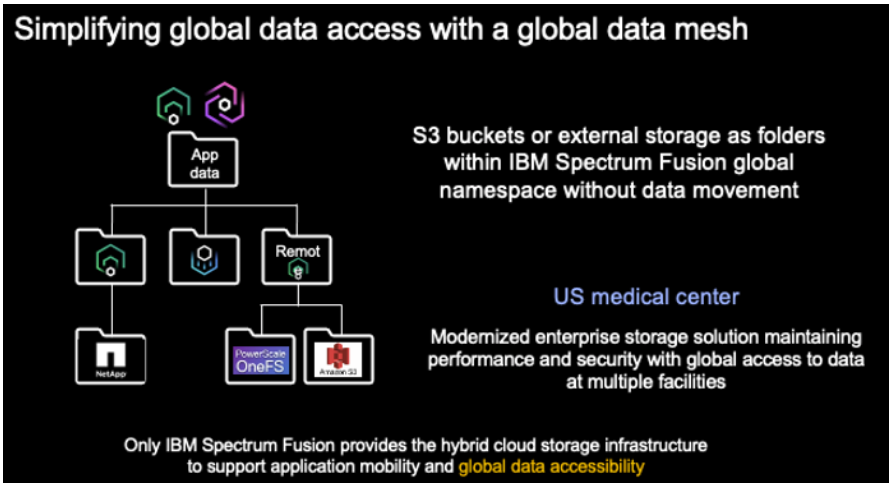
Spectrum Fusion HCI includes a dashboard that we can easily view and manage both the hardware and software resources for our OpenShift cluster. We can view CPU, memory, storage and network resources and utilization rates as well as important status events. Administrators can also manage local services such as software upgrades and storage services such as backup/restore from the main menu. Other services such as cloud management using IBM Cloud Satellite and OpenShift advanced cluster management (ACM) can also be accessed with one click from the dashboard. You can also see other resources such as server nodes, disks and switches as well as resource utilization rates and important event status.

Integrated management

The advantages of an integrated hardware and software offering come from the ways that these two parts of the offering work together. The management software was developed with the knowledge of what components can be included in the offering, and so the software was written to optimally configure the components and take advantage of their strengths.

But configuring the system on Day 1 is just the beginning of the what the integrated management software does. The software also monitors the system to make sure all components continue to function properly and will use the Call Home feature to alert IBM support of any hardware failure or serious error that it detects. And when the time comes to apply firmware updates to the system, it is the integrated management software that is used to orchestrate the updates.

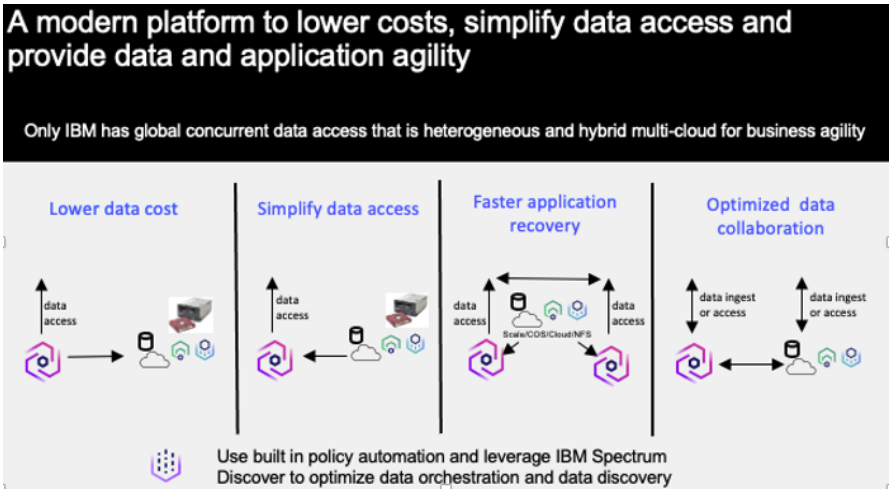
Global data mesh



A global data mesh

IBM Spectrum Fusion is built on a market-leading technology that provides global access to data transparently to a container application. The application sees the data as another local file structure. The data can be physically located in another data source, thousands of miles away. This global data access includes S3 object data from the cloud or on-premises, Network File System (NFS) data from Dell/EMC, Netapp, or other vendors and any IBM Spectrum Scale compatible storage system.

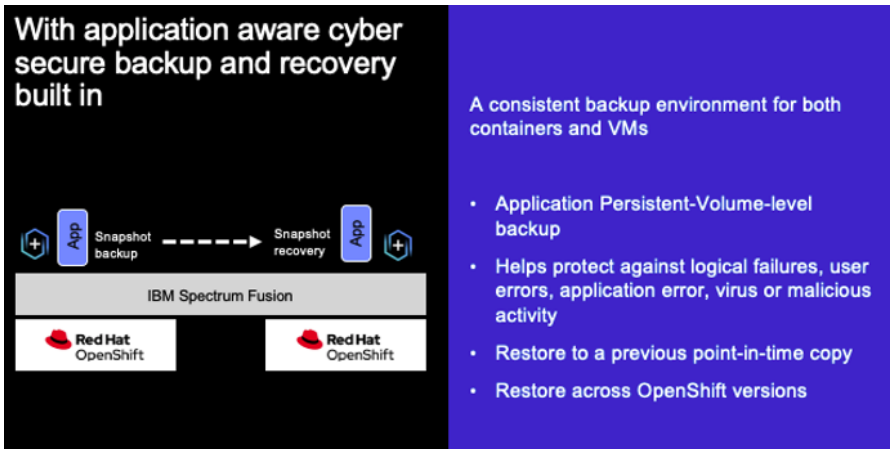
Cost, access, agility



Lower cost, simplify data access and provide agility

There are four important ways that customers can provide a better hybrid cloud and AI data infrastructure. #1 Lower data cost with optimized archiving #2 Simplify remote access or data migration with transparent global access #3 Faster application recovery with no data movement as with data that can be remotely accessed #4 Optimized data ingest and data collaboration.

Data resiliency



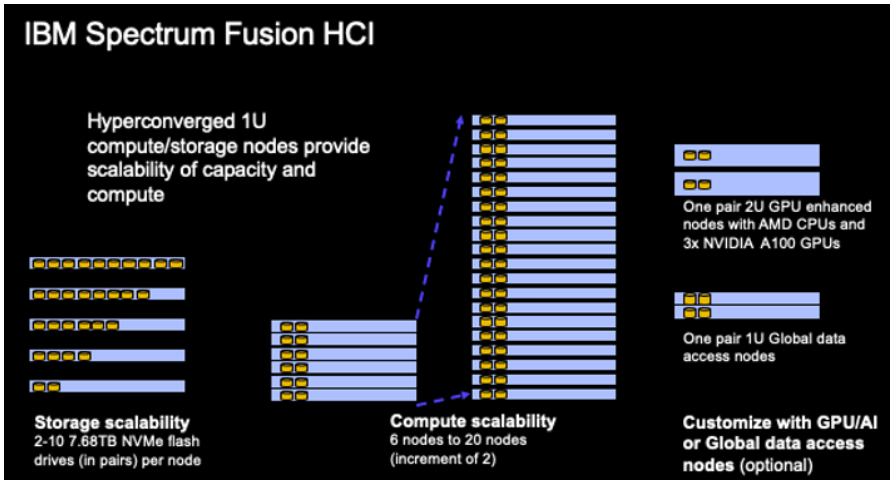
Data resiliency

IBM Spectrum Fusion has built in application aware backup and recovery. By leveraging the industry proven IBM Spectrum Protect Plus containerized software that is built into Spectrum Fusion ITOps can have a consistent way to not only backup Red Hat OpenShift container environments but also leverage the same interface to backup VMWare or RedHat OpenShift VM environment. This is the power of IBM Spectrum Fusion software with a “fused” storage services and storage platform solution.

Hardware configuration

Spectrum Fusion HCI is sold as a combined hardware and software offering. Clients do not have to spend time specifying and procuring hardware that can be used to efficiently support the software stack. Instead, the Spectrum Fusion development team has done the work for them by choosing the servers, switches and rack enclosure that are well suited for the for running the Spectrum Fusion HCI software stack.

IBM Spectrum Fusion HCI has been designed to eliminate single points of failure, and it does this by including redundant hardware for each of its critical components. Redundancy not only protects against the failure of a component, it also makes it possible to update component firmware without downtime by taking components offline one at a time to be updated and restarted.



Hardware summary

Server redundancy

As already mentioned, the failure of any two S&C servers can be tolerated without losing any data. In addition, the GPU servers and the AFM servers are only sold in pairs so that should one of the servers fail, there will be another server available so that the GPU or AFM services continue to be available.

Server types

IBM Spectrum Fusion HCI has three different server types available, each with a different purpose. Refer to Table 1: Server Configuration Details below for more information about the components used in each server type.

Storage and compute servers

The storage and compute (S&C) servers are the basic building blocks of IBM Spectrum Fusion HCI. Each system has a minimum of six S&C servers that are combined together to create a Spectrum Scale ECE storage cluster. Each of the S&C servers has a minimum of two storage drives that can be increased up to a maximum of ten storage drives on each server.

Usable Storage Capacity in TB

	# Storage/Compute Servers							
# Drives	**6**	**8**	**10**	**12**	**14**	**16**	**18**	**20**
2	61*	81	102	122	143	163	184	204
4	122	163	204	245	286	327	368	409
6	184	245	307	368	430	491	552	614
8	245	327	409	491	573	655	737	819
10	307	409	512	614	716	819	921	1024
Drive Capacity (TB)	7.68							

*All capacity values rounded down to the nearest TB

Useable storage summary

Storage disks

The Spectrum Fusion storage cluster is configured using the 4+2P protection type. In this configuration, the failure of any two storage and compute (S&C) servers can be tolerated without losing any data.

The OS boot drives used in all the Spectrum Fusion HCI servers are all configured in redundant pairs using RAID 1 hardware storage controllers.

Base configuration

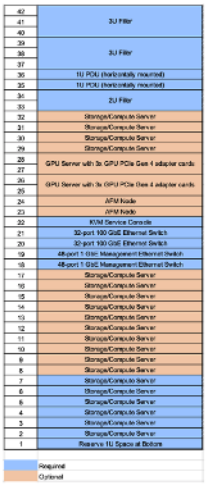
The **Base configuration includes**

- 42U rack
- Two Ethernet ToR switches (100GbE)
- Two Ethernet management switches
- Six 1U x86 storage/compute nodes

Spectrum Fusion HCI example

Base configuration includes:
- 42U rack
- 2x Ethernet high-speed switches
- 2x Ethernet management switches
- 6x Storage/Compute servers with 2 NVMe drives/server

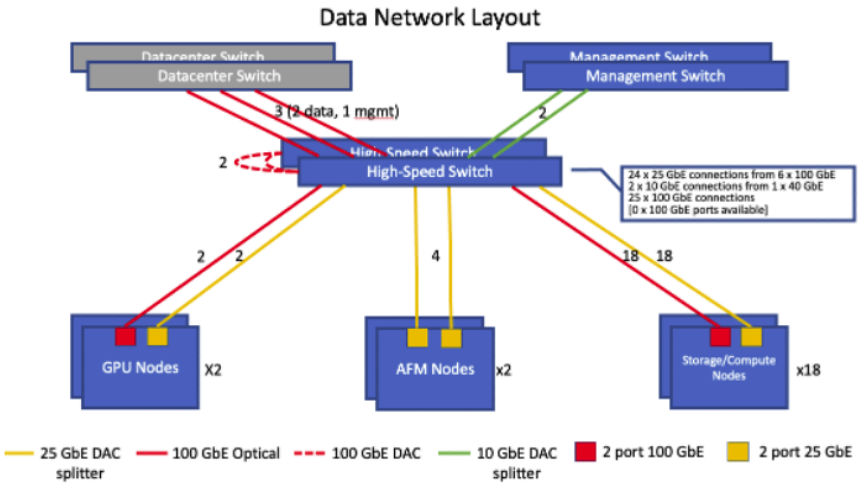
Options available:
- Additional storage/compute servers to a maximum of 20 (minus any GPU servers)
- A pair of 2U GPU servers, each with 3x NVIDIA A100 GPUs
- Increased storage by adding drives to storage/compute servers
  - 7.68TB NVMe PCIe Gen4 drives/server to a maximum of 10 drives/server
- AFM (Active File Manager) delivered as a pair of servers



Base configuration

It is possible to expand IBM Spectrum Fusion HCI beyond the minimum six S&C servers. Servers can be added to a maximum of 20. (Unless the GPU option is selected, in which case there can be a maximum of 18 S&C servers.) Each of the S&C servers added to Spectrum Fusion HCI is also added to the storage cluster, increasing the total storage capacity.

High speed data network



Data network

IBM Spectrum Fusion HCI has two physical networks defined within it: a high-speed network for use by the storage cluster and applications, and a management network that is used for controlling the servers and monitoring the health of the servers.

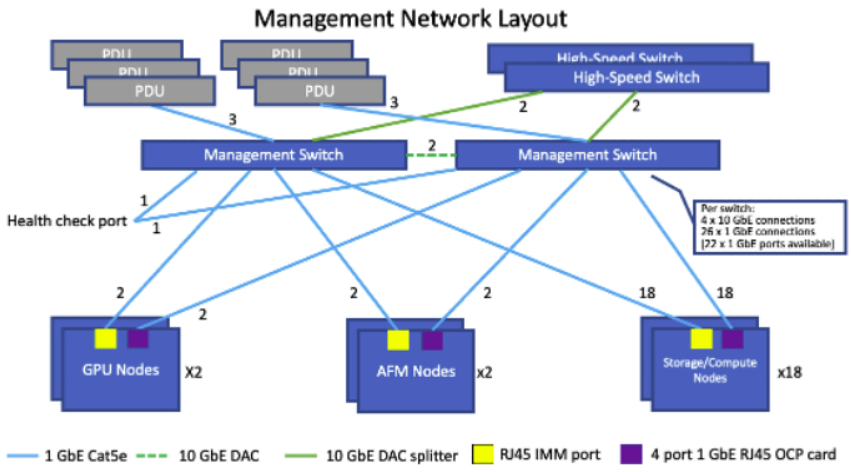
The high-speed network is built around a pair of 32-port, 100Gb Ethernet switches. The switches are configured together using MLAG to create a redundant pair. All of the S&C servers and the GPU servers have a 2-port, 100Gb Ethernet adapter. One port on the adapter is connected to the first high-speed switch and the second port is connected to the second high-speed switch. This 100GbE connections are reserved for use by the Spectrum Scale ECE storage cluster.

All of the S&C servers and the GPU servers also have a 2-port, 25Gb Ethernet adapter. Using breakout cables that split the 100GbE ports on the switch into four 25GbE ports, one port on the server's 25 GbE network adapter is connected to the first high-speed switch and the second port is connected to the second high-speed switch.

The AFM servers do not have a 2-port, 100 GbE network adapter. Instead, these servers have two of the 2-port 25GbE network adapters. Again, using breakout cables, each of the adapters has one port connected to the first high-speed switch and the other port connected to the other high-speed switch.

The 25GbE network connected are intended for use by the Red Hat OpenShift cluster and the applications that are deployed within that cluster.

Management network



Management network

The management network is built around a pair of 48-port, 1Gb Ethernet switches. The IMM port of every Spectrum Fusion HCI server is connected to the first of the management switches using CAT5e cables with RJ45 connectors. The alternate IMM port, on either the LOM or an OCP adapter, is configured for all Spectrum Fusion HCI servers and it is connected to the second management switch. These connections are also made using CAT5e cables with RJ45 connectors. This is all done so that there is redundancy to support management functions even if one of the management switches fails or one of the cables becomes disconnected.

Summary of components

	Storage & Compute Server	GPU Server	AFM Server
CPU	2x AMD EPYC 7302 16C (32C total) 3.0 GHz CPU	2x AMD EPYC 7F72 24C (48 cores total) 240W 3.2 GHz	2x Intel 6242 16C (32 cores total) 2.8 GHz
Memory	256GB RAM	512GB RAM	192GB RAM
OS Storage	2x 960GB M.2 OS drives (RAID 1)	2x 960GB M.2 OS drives (RAID 1)	2x 960GB SATA Hot Swap SSD drives (RAID 1)
Data Network	1x Mellanox ConnectX-6 dual-port 100GbE network adapter 1x Mellanox ConnectX-4 dual-port 25GbE network adapter	1x Mellanox ConnectX-6 dual-port 100GbE network adapter 1x Mellanox ConnectX-4 dual-port 25GbE network adapter	2x Mellanox ConnectX-4 dual-port 25GbE network adapter
Management Network (OCP/LOM)	1x 1GbE RJ45 4-port OCP adapter	1x 10GBase-T 2-port + 1GbE 2-port RJ45 OCP adapter	1x 1GbE RJ45 2-port LOM
Data Storage	2-10x 7.68TB NVMe PCIe 4.0 disks	2x 2.5" PM1645a 3.2TB Mainstream SAS 12Gb Hot Swap SSD	
GPU		3x NVIDIA A100 40GB PCIe 4 passive GPUs	

Why IBM?

Speed Development and ease operations

•Preconfigured infrastructure to develop cloud native applications faster (DevOps)

•All in one solution to simplify management with scalability for future growth (ITOps)

Hybrid Cloud Integration

•Improve collaboration of applications connecting hybrid cloud data

•Create application and data agility with integration
of data center to public cloud resources

Lower cost of infrastructure

•Connect data silos to avoid duplication of data which lowers overall storage costs

•Merge compute and storage resources to lower overall costs

Modernize AI workloads

•Support GPU accelerated applications with NVIDIA A100 GPU Nodes

•Integrate IBM Cloud Pak's to infuse AI across organization

For more information

For more information about IBM Spectrum Fusion or our fully integrated IBM Spectrum Fusion HCI appliance solution, please visit our solutions page, or contact your IBM representative or IBM Business Partner. If you don’t yet have an IBM representative or business partner, you can fill out this form to schedule a consult with our storage experts.

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