



Highlights

- Mixed host interfaces support (Fibre Channel/iSCSI) enables SAN tiering
 - Balanced performance well-suited for virtualization/consolidation
 - Support for low power, fast solid-state disks (SSDs)
 - Self-encrypting drives secure data throughout your drive's lifecycle
 - Support for intermixing Fibre Channel, SED, SATA, SAS, SAS-NL and SSD drives enables cost-effective tiered storage
 - Feature-rich management software designed to maximize use and minimize storage TCO
 - Key application certifications ensure confidence
 - Supports IBM® AIX® and Power Systems™ T10-PI Data Integrity Initiative
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IBM System Storage DS5020 Express

Manage growth, complexity, and risk with scalable, high-performance storage

Manage data effectively

Optimized data management requires storage solutions with high data availability, strong storage management capabilities and powerful performance features. The IBM System Storage® DS5020 Express® is designed to provide low total cost of ownership, high performance, robust functionality and unparalleled ease of use. As part of the System Storage DS5000 series storage system, the DS5020 Express offers:

- High-performance 8 Gbps-capable Fibre Channel connections.
- Optional 1 Gbps iSCSI interface.
- Up to 336 TB of physical storage capacity with 112 SAS-NL (3 TB) disk drives.
- Powerful system management, data management and data protection features.

Achieve a low total cost of ownership

Facing relentless data growth and shrinking budgets, companies continue to look for ways to improve efficiency and reduce costs. Eight Gbps Fibre Channel allows companies to reduce the number of host bus adapters per server and the number of overall ports in their Fibre Channel storage area network (SAN) infrastructure without sacrificing performance, thus saving acquisition and operational costs.



Additionally, auto-negotiating 8 Gbps Fibre Channel interfaces allow the DS5020 Express to integrate seamlessly into an existing 2 Gbps or 4 Gbps infrastructure, while offering investment protection going forward when the SAN inevitably becomes 8 Gbps.

The system is designed to help you avoid over-configuration for an affordable entry-point while offering seamless “pay-as-you-grow” scalability as requirements change. Its efficient storage use is designed to reduce raw capacity requirements. The ability to intermix high-performance and high-capacity drives enables tiered storage in a single enclosure. These unique abilities reduce the number of drives needed to meet performance and capacity demands and can significantly reduce acquisition and operational costs.

Establish high data availability

The DS5020 Express is designed to support a storage environment that can deliver unprecedented data availability. Offering a choice of multiple redundant array of independent disks (RAID) levels and redundant, hot-swappable components, the disk storage system can help you maintain data availability and security. Powerful dynamic capabilities go beyond respond and recover to help protect data and prevent failure. IBM FlashCopy® solutions allow you to benefit from enterprise-class disaster recovery strategies and point-in-time copying.

The IBM DS5000 series allows flexible access to data to enhance information insights. The series also provides a broader range of scale and performance options to provide structure and context to information. As a result, you can build data management strategies that align with your information requirements. The DS5020 Express can help accommodate the changing value of data over time while maintaining data availability.



The DS5020 Express offers redundant components, automated input/output (I/O) path failover, and extensive online configuration, reconfiguration and maintenance capabilities to ensure your data is available 24x7. The DS5020 Express ensures stored data is protected and offers:

- Self-encrypting drives to secure data-at-rest with no performance penalty.
- DACstore technology to store configuration metadata on each drive.
- Proactive Drive Health Monitoring (PDHM) technology to identify faulty drives before they create problems.
- RAID 6 technology to guard against concurrent drive failures and errors.
- Persistent cache backup to ensure any data in cache is captured and safe in the event of a power outage.

All of these features combine to create a trusted system in which to store your data.

Increase performance

The DS5020 Express offers high-performance storage to help manage compute-intensive workloads. It is a great fit for both transaction-oriented and bandwidth-intensive applications. The DS5020 Express is also a great choice for environments with intense replication requirements, because it can efficiently handle the additional performance demands of FlashCopy, VolumeCopy and enhanced Remote Mirroring.

The DS5020 Express Model 20A has up to eight independent 8 Gbps Fibre Channel host ports for direct attachment to servers or fabric attachment to SANs. One of the first enterprise-class storage systems based on 8 Gbps Fibre Channel technologies, the system can help you prepare for the future while making the most of your current infrastructure. It supports auto-negotiation for Fibre Channel connection speeds, allowing integration into an existing 2 Gbps or 4 Gbps infrastructure. The storage system can also deliver performance and connectivity improvements, while helping you prepare for when the SAN inevitably becomes 8 Gbps.

The four 4 Gbps drive connections support up to 112 disk drives with up to six attached EXP520 disk enclosures. The DS5020 Express is designed to support up to 336 TB of storage capacity with SAS-NL disk drives or up to 100.8 TB of SAS physical storage capacity and is available with up to 4 GB of physical cache memory (2 GB per controller).

With the same robust, yet intuitive storage management software as previous storage systems in the series, administrators can easily manage the complete storage environment for maximum use of storage capacity and complete control over a rapidly growing storage environment.

In the same way storage administrators have benefited from tiered storage—using high-performance solid state drives (SSD) or Fibre Channel drives for primary storage and lower-cost SATA drives for secondary storage—they can now benefit from tiered SANs. IBM DS5000 series storage systems offer high-performance, highly reliable Fibre Channel interfaces for production servers, and low-cost iSCSI interfaces for secondary servers. This combination allows you to implement a single storage system to support all shared storage requirements—maximizing productivity, reliability and costs.

Serve a wide range of storage consolidation and clustering applications

The DS5020 Express is an affordable, scalable storage server for storage consolidation and clustering applications. Its modular architecture, which includes Dynamic Capacity Addition and Dynamic Volume Expansion, can enable storage to grow as demands increase. Autonomic features such as online firmware upgrades and DS Remote Support Manager also help enhance the system's usability.

The system supports consolidation of direct-attached storage into a centrally managed, shared or SAN environment. With built-in support for eight Fibre Channel-attached servers, the need for additional switches is reduced or eliminated, helping to make server clustering more cost-effective.

Expand your storage solution with the IBM System Storage EXP520 storage expansion unit, offering a 16-bay disk enclosure. Achieve up to 14.4 TB physical capacity per expansion unit using 16 SAS 900 GB disk drives, or up to 48 TB physical capacity per expansion unit using 16 SAS-NL 3 TB disk drives.

EXP520 drive enclosure (1814-52A)

The EXP520 drive enclosure is more than “just-a-bunch-of-disks.” It’s designed to optimize performance, availability and serviceability. It offers:

- 4 Gbps Fibre Channel interfaces for high-speed connectivity.
- Up to 16 Fibre Channel, SED, SATA, SAS, SAS-NL and SSD disk drives.
- ESM-imbedded “loop switch.”
- Redundant 4 Gbps Fibre Channel drive loops ensure complete accessibility to all drives in the event of a loop or cable failure.
- Redundant power supplies, cooling fans and Environmental Service Modules (ESMs).

All primary components are hot-swappable Customer Replaceable Units (CRUs) and can be easily accessed, removed or replaced.

Intermix capabilities

The DS5020 Express helps support an intermix of Fibre Channel, SED, SATA, SAS, SAS-NL and SSD disk drives within the controller. It also supports attachment of EXP520 and legacy EXP810 enclosures to further enhance storage use.

Scalability from workgroup to enterprise SAN

Because the DS5020 Express is designed to be highly scalable, supporting up to 112 Fibre Channel, SED, SATA, SAS, SAS-NL and SSD disk drives, it can be upgraded from a workgroup SAN to an enterprise network storage system to grow with your business. In addition, with IBM System Storage DS® Storage Manager software, multiple DS5020 Express systems can be combined to help address additional performance and capacity requirements.

Dynamic Capacity Expansion (DCE) supports adding EXP520 enclosures to an existing DS5020 Express without stopping operations. This can help you bring unused storage online for a new host group or an existing volume to provide additional capacity on demand.

The DS5020 Express also supports online controller firmware upgrades to offer performance and functionality improvements with limited system disruption. Events such as upgrades to support the latest version of DS Storage Manager or to add optional services such as the DS Remote Support Manager for Storage can often be executed without stopping operations.

Centralize administration through DS Storage Manager

The DS Storage Manager software included with the DS5020 Express supports the centralized management of local and networked DS5020 systems. Administrators can customize and change settings, configure new volumes, define mappings, handle routine maintenance and dynamically add new enclosures and capacity to existing volumes—without interrupting user access to data. Failover drivers, performance tuning routines and cluster support are also standard features of DS Storage Manager. The DS Storage Manager can help reduce the complexity of storage management and the amount of time spent managing storage.

Enhance storage management capabilities

Using DS Storage Manager software, administrators can partition the DS5020 Express into as many as 128 virtual servers. Your IT organization can strategically allocate storage capacity to achieve high use of storage space and low hardware and storage management costs. Instead of purchasing multiple RAID controllers with their own dedicated disks and management, you can attach multiple servers to one central system—the DS5020 Express—which provides hardware failover with dual controllers and common management.

Other DS5020 Express features that can help enhance data management and protection include:

- FlashCopy, which enables point-in-time copies of logical volumes that may be used for file restoration, backups, application testing or data mining.
- Dynamic Volume Expansion, which allows administrators to resize logical volumes without disrupting users.
- VolumeCopy, which provides full replication of one logical volume (source) to another (target) within DS5020 Express.
- Enhanced Remote Mirror, which consists of Global Mirror with Asynchronous Write-order Consistency (critical for mirroring multi-LUN applications), Global Copy with Asynchronous and Metro Mirror with Synchronous.

The DS5020 Express uses a common pool of hot-spare disk drives as a cost-effective way to help improve availability. IT administrators can determine the number of drives to allocate as spares.

Manage storage with additional tools

The DS5020 Express is supported by a variety of IBM Tivoli® software products. Tivoli Storage Manager, Tivoli Storage Resource Manager and many other third-party hardware and software products can add to the capabilities of the DS5020 Express by enabling backup and storage reporting.

Support for the new Tivoli Storage Productivity Center for Disk Select V4.2.2 is designed to provide storage device configuration, performance monitoring and management of SAN-attached devices from a single console. In addition, it

includes performance monitoring capabilities for the DS3500. Key features of Tivoli Storage Productivity Center for Disk Select V4.2.2 include:

- Continuous real-time monitoring and fault identification to help improve SAN availability.
- Performance reporting across multiple arrays from a single console.
- Monitoring metrics such as throughput, I/O and data rates, and cache use.
- Timely alerts that can enable event action based on your policies when thresholds are exceeded.
- SAN monitoring and maintenance features to help improve storage return on investment.
- Simplified management of complex SANs to help reduce storage administration costs.

Service, support and financing

The DS5020 Express is a customer set up disk system with a 3-year, 9×5, next-business-day hardware and software warranty. Additional services for hardware installation, DS Storage Manager configuration and advanced storage management are also available from IBM Global Services. IBM Support Line services can assist with using DS Storage Manager to enable self-maintenance for the DS5020 Express.

The optional DS Remote Support Manager for Storage service enables the DS5020 Express to notify the IBM Support Center quickly when the system detects a problem. This notification can help reduce or eliminate the need for a service call. To help expedite diagnosis and repair of failed hardware and software, error alert messages from DS Storage Manager can be forwarded through email.

IBM System Storage DS5020 Express at a glance

Characteristics

Model	1814-20A
RAID controller	Dual active
Cache	4 GB Battery-backed
Host interface	Four 8 Gbps Fibre Channel Eight 8 Gbps Fibre Channel Four 8 Gbps Fibre Channel Four 1 Gbps iSCSI
Drive interface	4 drive ports—Fibre Channel Switched and Fibre Channel Arbitrated Loop standard, Auto-sensing 2 Gbps/4 Gbps
Supported drives	4 Gbps Fibre Channel/SED: 15k RPM—300 GB, 450 GB, 600 GB 4 Gbps SATA: 7.2K RPM—1 TB and 2 TB 6 Gbps SAS: 10k RPM—300 GB, 600 GB, 900 GB SSD*: 200 GB and 400 GB 6 Gbps SAS (3.5"): 7.2K RPM—3 TB
RAID levels	0, 1, 3, 5, 6, 10
Maximum capacity	Up to 336 TB of SAS-NL physical storage capacity, or up to 224 TB of SATA physical storage capacity, or up to 100.8 TB of SAS physical storage capacity, or up to 8 TB of SSD physical storage capacity
Storage partitions	4, 8, 16, 64 or 128 storage partitions
Maximum drives supported	112 Fibre Channel, SED, SAS, SAS-NL, SSD or SATA drives (using 6 EXP520 Expansion Units)
Fans and power supplies	Dual redundant, hot-swappable
Rack support	
SAN support	Supported IBM Fibre Channel switches and directors (product numbers 2005, 2006, 2109, 2026, 2027, 2031, 2032, 2034, 2042, 2054, 2061 and 2062, and IBM BladeCenter®)
Management software	IBM System Storage DS® Storage Manager version 10.xx
Warranty	Three-year parts and labor warranty, 9x5 next business day, upgradeable to 24x7 with 4 hour response

Physical characteristics

Dimensions	H - 130.3 mm (5.13 in) W - 447.0 mm (17.6 in) D - 563.8 mm (22.2 in)
Supported systems	For a list of currently supported servers, operating systems, host bus adapters, clustering applications and SAN switches and directors, refer to the DS5020 Express Interoperability Matrix. The DS5020 Express is supported only in rack installations. With optional features, up to six EXP520 Expansion Units can be attached to the DS5020 Express up to a maximum of 112 drives.

Model	Model description	Interface	Model includes
1814-52A	Drive Enclosure	4 Gbps Fibre Channel interface	ESM-imbedded

EXP520 Drive Enclosure

Relative Humidity (no condensation)	EXP520 Drive Enclosure
Operating range	8% to 80%
Storage range	5% to 80%
Maximum dew point	26° C (79° F)
Maximum gradient	10% per hour
Altitude ranges	EXP520 Drive Enclosure
Operating	30.5 m (100 ft) below sea level to 3,000 m (9,842 ft) above sea level
Storage	30.5 m (100 ft) below sea level to 3,000 m (9,842 ft) above sea level
Transit	30.5 m (100 ft) below sea level to 12,000 m (40,000 ft) above sea level
Heat dissipation	EXP520 Drive Enclosure
Btu/Hr	1,516
KVA	0.454
Watts (AC)	443
Amps (240 V ac)	2.25

The tabulated power and heat dissipation values are the maximum measured operating power.

Acoustic noise	EXP520 Drive Enclosure
Sound power	6.5 bels
Sound pressure	65 dBA
Power input	EXP520 Drive Enclosure
Nominal voltage range	100 V ac to 240 V ac
Frequency range	50 to 60 Hz
Maximum operating current	6.0 A at 100 V ac 2.5 A at 240 V ac

For more information

To learn more about the IBM System Storage DS5020 Express, please contact your IBM representative or IBM Business Partner, or visit the following websites:

- ibm.com/systems/storage/disk/ds5020
- ibm.com/systems/express/storage

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* Limitation - a maximum of 20 solid state drives (SSD) are supported in a DS5020 system (which includes all of the attached expansion enclosures)



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Produced in the United States of America
November 2011

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