IBM TS4500 Tape Library

A next-generation cloud storage solution that delivers high storage density and integrated management

Big data offers vast opportunities for business insight, but you need the right technology to help you manage and use that data. IBM cloud solutions can help you harness the power of big data while reducing costs and enabling a secure environment.

TS4500 answers those business needs by incorporating the latest generation of industry-leading LTO and IBM enterprise-class technology that will help organizations handle the growing data demands of modern tape use cases like big data, cloud, media and entertainment, ultra high-definition editing, digital video surveillance, Internet of Things (IoT), active file archiving and, of course, backup.

The next-generation IBM TS4500 Tape Library is designed to help midsized and large enterprises meet cloud storage challenges, including data volume growth, rising storage footprint costs, data migration efforts and the increased complexity of IT training and management as staff resources shrink.

TS4500 delivers the density that today's data growth requires—along with the efficiency and manageability to grow with business needs while preserving your existing investments in IBM tape library products. You can achieve both a low per-terabyte cost and high density, with up to 8.76 PB of data in a single 10 square-foot library using LTO Ultrium 8 cartridges or 11 PB with 3592 cartridges.

TS4500 provides advanced capabilities for integrated tape drive and media management, delivered within a single-pane-of-glass management console. The TS4500 graphical user interface (GUI) is based on the unified interface used in

Highlights

- Store up to 351PB (1.05 EB compressed) per library with IBM 3592 cartridges

- Proactively monitor archived data with policy-based media verification

- Strengthen security and compliance with encryption and WORM media

- Simplify user access to data stored on tape via IBM Spectrum Archive

- Provide a flexible upgrade path to expand tape storage as needs grow

- Reduce storage footprint and simplify cabling with 5U or 10U top rack space

- Optimize connectivity with FC, Ethernet and SAS interface attachments

- Cyber resilient technology with physical air gap

other IBM storage solutions. It includes key features to help guide storage administrators in completing critical tasks. For example, you can monitor a tape library via persistent, at-a-glance library utilization and health status indicators.

IBM TS4500 features such as automatic control-path and data-path failover, tape-drive encryption, dual robotic accessors and WORM media support improved management and help to reduce risk in the cloud.

In addition, IBM TS4500 now supports IBM z15, the latest generation of IBM Z servers, through virtual tape attachment. Mainframe administrators can trust TS4500 to help reduce floorspace costs and increase overall capacity.

Automates solutions for cloud environments

TS4500 is a tape drive integration leader, with features including a persistent worldwide name, multipath architecture, drive/media exception reporting, remote drive/media management and host-based path failover. TS4500 L25, D25 and S25 frames support IBM TS1160, TS1155, TS1150, and TS1140 tape drives, while TS4500 L55, D55 and S55 frames support LTO Ultrium 8, 7, 6 and 5 tape drives. LTO Ultrium tape drives and TS1160, TS1155, TS1150 and TS1140 tape drives can be mixed within the TS4500 library, frame by frame. The L-frame and D-frame models help boost efficiency with improved hot-swappable drive packaging. All of the frames include high-density (HD) slot technology that can greatly increase a library's total capacity.

TS4500 frame models can be placed in any active position, so the library can grow from both the right and the left side of the first L frame for floorspace flexibility. A dual-accessor option can help increase mount performance and overall system reliability and availability. Accessors can be serviced at the ends of the library, eliminating the need for a dedicated service bay frame.

A top-rack offering can also provide optional 5U or 10U of rack space on top of the library for Fibre Channel switches, tape data movers or IBM Spectrum Archive nodes.

IBM TS4500 Tape Library

Delivers capacity on demand

The TS4500 library frame provides a more flexible upgrade path for users who want to expand their tape storage as their needs grow. Capacity on demand configurations for TS4500 L-frame models include an entry-level configuration, an intermediate configuration and a base-capacity configuration. All models also support HD capacity on demand configurations.

Includes advanced features

TS4500 is designed with advanced features to deliver cutting-edge performance and long-term value. For example, the Advanced Library Management System (ALMS) feature supports dynamic storage management, enabling you to create and change logical libraries and configure any drive into any logical library. TS4500 also offers automatic control-path and data-path failover to help improve business continuity and disaster recovery, and policy-based automatic media verification can help minimize data risk.

Optimized connectivity for drive optimization

IBM TS4500 supports the latest TS1160 tape drive which provides reliable and cost-efficient connectivity with two different drive versions to help optimize drive utilization and reduce infrastructure requirement. TS1160 can be shared on a storage area network through the existing Fibre Channel 16 Gb interface, or Ethernet version designed for hyperscale and RHEL environment with support for Ethernet 10 Gb interface, if speed is the need an 25 Gb can be supported via RPQ. The TS1160 expanded attachment support, adding to the portfolio a new SAS 12 Gb interface.

Centralizes tape management

IBM offers a wide range of management software options for TS4500. The management software options include:

- **IBM Spectrum Archive**—Allows users and applications to directly access files and directories stored on tape

- **IBM TS4500 command-line interface (CLI)**—Provides access to TS4500 library management commands

- **IBM Tape System Library Manager**—Allows multi-library environments to be managed as a single system

- **IBM Security Key Lifecycle Manager**—Simplifies encryption key management with an intuitive user interface

Inside IBM TS4500 Tape Library

Cyber resilient technology with physical air gap

The term "air gap" refers to physical or virtual isolation of systems or networks to avoid widespread corruption of data due to malware infection, system failures, or human error. The basic concept around an air gap is to bring secondary storage systems online periodically to incorporate the latest changes and then take them back offline. The "offline by design" nature of tape offers a true physical air gap and provides one of the most secure protections to confront cyber crime.

IBM TS4500 Tape Library at a glance

Frame definition	L25—Base frame for TS1160, TS1155, TS1150, and TS1140 (3592) drives and cartridges—includes 32 input/output (I/O) slots
	D25—Drive-capable and storage expansion frame for TS1160, TS1155, TS1150 and TS1140 (3592) drives and cartridges
	S25—Storage-only expansion frame for 3592 cartridges
	L55—Base frame for LTO drives and cartridges—includes 36 I/O slots
	D55—Drive-capable and storage expansion frame for LTO drives and cartridges
	S55—Storage-only expansion frame for LTO cartridge
Tape drive types	TS1160, TS1155, TS1150, and TS1140 (3592), LTO Ultrium 8, 7, 6 and 5 tape drives
Number of frames per library	One base frame, up to 17 expansion frames with maximum of 7 Dx5 frames
Number of drives	Up to 16 per frame (up to 12 in frame 1)
	Up to 128 per library
Number of tape cartridges	L25—up to 660 (up to 550 in frame 1)
	D25—up to 740 (up to 590 in frame 1)
	S25—up to 1,000 (up to 798 in frame 1)
	Total supported per library: up to 17,550
	L55—up to 882 (up to 730 in frame 1)
	D55—up to 970 (up to 774 in frame 1)
	S55—up to 1,320 (up to 1,054 in frame 1)
	Total supported per library: up to 23,170
Capacity*	3592 advanced cartridges: up to 351 PB per library (1.05 EB with 3:1 compression)
	LTO Ultrium 8 cartridges: up to 278 PB per library (up to 695 PB with 2.5:1 compression)
Operating systems support	See the IBM System Storage Interoperation Center

Table 2. Physical characteristics of Top Rack frame models

Physical Characteristics	3584 Model TR2	3584 Model TR1
EIA Space	5U	10U
Height	266.6 mm (10.5 in)	520 mm (20.44 in)
Width without covers†	725 mm (28.5 in)	725 mm (28.5 in)
Width with covers	782 mm (30.8 in)	782 mm (30.8 in)
Depth (including front and rear doors)	1212 mm (47.72 in)	1212 mm (47.72 in)
Weight of Top Rack Empty‡, §	17.5 kg (38.5 lb)	24.5 kg (54 lb)
Weight of Top Rack with 2 Side-Panels, Front and Rear Doors	32.4 kg (71.5 lb)	

* Capacity depends on drives installed, number and type of cartridges used, and compression ratio achieved. Listed capacity is physical. Usable capacity may be less.

† Frame width only. Extra inter-frame spacing of 30 mm (1.2 in.) is required.

‡ A TR1 top rack can optionally be installed on any TS4500 frame. Side panels and PDUs are also optional. Each side panel adds 6.8 kg (15 lb). Each PDU adds 4.5 kg (10 lb).

§ A TR2 top rack can optionally be installed on any TS4500 frame. Side panels, PDUs, Front Doors, and Rear Doors are also optional. Each side panel adds 3.6 kg (8 lb). Each PDU adds 4.1 kg (9 lb). Each door adds 3.2 kg (7 lb).

Why IBM?

The performance and availability of your storage environment can either enhance or hamper your business processes. That's where IBM comes in. As a market leader in the storage industry, IBM can help you handle the challenges, whether you are a small to midsized company or a large enterprise.

Innovative technology, open standards, excellent performance and a broad portfolio of proven storage software, hardware and solutions offerings are just a few of the reasons you should consider storage solutions from IBM, including IBM TS4500 Tape Library.

For more information

To learn more about IBM TS4500 Tape Library, please contact your IBM representative or IBM Business Partner, or visit: **ibm.com**/us-en/marketplace/ts4500

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