



**IBM Systems**  
Solution Brief

## Intuitive, low-cost and direct access to long-term active data archives

*Navigate tape storage as easily as any other file system with IBM Spectrum Archive Library Edition*



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### Highlights

- Reduce per-cartridge and archive costs versus legacy video tape storage formats
  - Simplify direct access and management of selected tape drives and tape libraries and their data
  - Utilize IBM® Spectrum Archive™ Library Edition incorporating the IBM Linear Tape File System™ format standard for reading, writing and exchanging descriptive metadata on certified tape cartridges
  - Reduce complexity with an operating system (OS) browser interface providing an icon-based directory-tree view of libraries
  - Save costs with “self-describing” tape cartridges that eliminate the need for external databases
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As the sheer volume of commercial digital data continues to compound, so does the challenge of storing this data long term. Traditionally, the bulk of data stored by organizations has comprised functions that run business, such as email or billing. But more and more, organizations are storing rich media content, such as medical images or security tapes, that takes up more space and must be stored indefinitely. What is more, organizations need easy access to this data—a tall order with traditional tape storage systems. And while many organizations struggle with whether to use tape or disk storage, the decision should not be that difficult.

For one thing, tape is significantly more cost effective than disk for storing long-term active archives. One recent report found not only that disk was more than 26 times more expensive than tape and used 105 times more energy—but that this energy usage alone cost more than all the costs for tape.<sup>1</sup> As for access, IBM offers a tape solution created solely to enable users to create large, long-term archives—and to navigate them easily.

IBM Spectrum Archive Library Edition (Spectrum Archive LE) incorporates IBM Linear Tape File System, an open, non-proprietary solution that lets any application write files into a large archive. It provides direct, intuitive and graphical access to data stored in IBM tape drives and libraries using Linear Tape-Open (LTO) Ultrium generation 6 or 5 tape cartridges, IBM 3592 tape cartridges and IBM TS1140 or TS1150 tape drives.



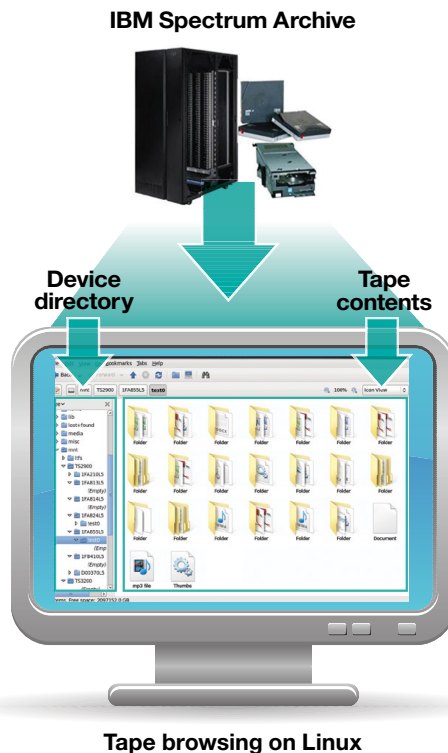


## IBM Systems Solution Brief

### Gain fast, efficient data access

Historically, tape storage has required device-specific software to read, write and manage data stored on its cartridges in libraries. Even with tape management software, file access was not intuitive, as it required users to know which cartridge volume contained the files they needed. And because operating systems were not typically shipped with built-in tape library support, standard OS disk interfaces did not enable direct reading and writing to tape cartridges stored in tape libraries.

IBM designed the Spectrum Archive LE to be as easy to use as any other medium, including disk or removable flash memory. Such ease of use requires a file-system interface that behaves like disk, as well as the flash-drive-like ability to share data without regard to platform. Spectrum Archive LE uses the LTFS format and resources of the OS on which it is running to graphically display the contents of a tape library in the OS graphical user interface format, typically a folder/tree structure. Each volume is displayed as a separate directory.





## IBM Systems Solution Brief

In addition, Spectrum Archive LE enables users to create a single file system mount point for a logical library managed by a single instance of Spectrum Archive LE, running on a single computer system. The LTFS metadata of each cartridge, once mounted, is cached in server memory. So even after the cartridge is ejected, the cartridge metadata information remains viewable and searchable, with no re-mounting required. And every cartridge and file is accessible via OS file system commands, from any application.

This improvement in search efficiency can be substantial, considering the need to search hundreds or thousands of cartridges typically found in tape libraries.

### Reduce file, digital content and archiving costs

Now that IBM has simplified tape storage with Spectrum Archive LE, users can take advantage of the significant cost benefits tape has over disk storage. In fact, LTO Ultrium technology offers a per-cartridge cost improvement of 99.3 percent when switching to digital tape for video content versus using analog-based video tape.<sup>2</sup> Spectrum Archive LE also helps reduce networking bandwidth expenses by leveraging tape's portability advantage for content sharing, editing and distribution. The ability to read and write LTO Ultrium 6 and 5 and 3592 tape cartridges without the need for additional proprietary tape software also can save money. LTO Ultrium 6 and 5 tape cartridges can be read by the tape equipment of any vendor who adheres to the LTO Ultrium and LTFS specifications.

Additionally, Spectrum Archive lengthens the time data can be preserved by leveraging tape's long shelf life and longer-generation migration cycles.

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### The University of Bratislava uses tape to preserve cultural heritage

For a number of years, Slovak cultural institutions have been preparing for the mass digitization of millions of cultural artifacts from around the country. The Univerzitna kniznica v Bratislave (University Library at The University of Bratislava) was one of the sites chosen to develop, implement and operate a central archive to store the national heritage of digitized objects from libraries, museums, galleries, and audio and video institutions.

To achieve the reliability, robustness and open standards it needed to implement a solution for moving and archiving data, the university turned to IBM for assistance. The result is a 25 petabyte (PB) archive in three locations—primary site, secondary site and dark archive—the largest digital archive in Slovakia.

The archiving process harvests digital data from museums, galleries, libraries and other locations, stores them on LTO Ultrium tapes in remote workplaces and then transports data to the primary site. There, it is copied to disk storage using Spectrum Archive Library Edition and the final version is processed for archiving.

With Spectrum Archive Library Edition, data can be easily processed, managed and moved from its original site into an archive.

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## Why IBM?

The IBM Spectrum Archive family featuring IBM Linear Tape File System technology provides direct, intuitive and graphical access to data stored on tape cartridges. As a continuous innovator, IBM invented the LTFS format and was first to market the open file system for single LTO Ultrium tape drives. LTFS is an outgrowth of a decade of leadership as a founding member of the LTO Consortium and a market-leading supplier of LTO Ultrium tape drives, libraries and cartridges.

With 60 years in the marketplace, IBM continues to create innovative data storage products to help organizations back up and restore data for business continuity, recover data in times of disaster, and archive for data protection and long-term retention. And IBM continually upgrades the file system in order to offer more benefits to suit today's business needs.

In addition to Spectrum Archive Library Edition, IBM also offers Spectrum Archive Single Drive Edition and Spectrum Archive Enterprise Edition software.

## For more information

To learn more about IBM Spectrum Archive Library Edition, please contact your IBM representative or IBM Business Partner, or visit: [ibm.com/systems/storage/tape/ltfs/](http://ibm.com/systems/storage/tape/ltfs/)

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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.

<sup>1</sup> The Clipper Group, Inc., "Is tape the best low cost technology for the preservation of data?," July 2014

<sup>2</sup> 99.3 percent is based on LTO-5 cost of \$0.012/min vs. HDCAM SR cost of \$1.67/min (LTO price = \$38/150 TB [3,126 minutes of video] cartridge vs. SR video cartridge price of \$107/64 minutes of video). Information accessed January 16, 2013. [www.tapeonline.com](http://www.tapeonline.com)



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