

XenData® Product Brief:

SX-550 Series Servers for LTO Archives



The SX-550 Series of Archive Servers creates highly scalable LTO Digital Video Archives that are optimized for broadcasters, video production companies, post-production and media operations. They are compatible with a wide range of LTO robotic libraries including those using LTO-7 drives - the latest generation that delivery high capacity, high speed and 30 years cartridge lifetimes.

Overview

A XenData SX-550 Series Archive Server manages one or more LTO tape libraries and RAID. It provides a highly scalable network attached storage device where files are written to LTO tape cartridges and disk.

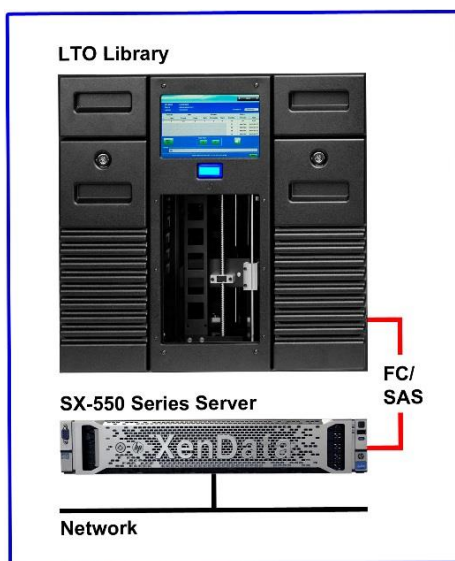


SX-550 Archive Servers run a Windows Server 2012 R2 operating system and combine two leading products: HP's DL380 Gen 9 server hardware and XenData6 Server software. The SX-550 Series is offered in five standard configurations, each optimized for video archive applications.

Files are presented in a standard file/folder structure which is typically shared over the network. Files are transferred to and from the archive using either the standard Windows network protocol (CIFS/SMB) or FTP file transfers. In addition, files may be transferred locally. This non-proprietary approach to the interface means that the archive can be used simultaneously by multiple standard applications and it does not tie the user to any particular asset management, automation or NLE system.

In addition to the standard file/folder interface, the SX-550 provides an object storage interface using an XML API. The XML instructions are sent and received from a network socket (port 3466) and include the ability to pull assets from a source location and push them back to that location. The XenData object storage interface has been adopted by an increasing number of media asset management providers. It provides a rich interface with efficient data flows.

Archive Configuration



The SX-550 Series Archive Server connects to an LTO tape library via multiple SAS or Fibre Channel connections. Prior to shipment from XenData, the SX server is configured to meet the specific connectivity requirements of the chosen LTO library.

The SX server connects to the network via 1 or 10 GbE. Four 1 GbE network connections are provided as standard and 10 GbE is available as an option. The server may also be connected to a SAN via Fibre Channel or Ethernet.

The SX-550 includes disk cache (or manages external RAID) which is used to enhance archive and restore performance and may also be used to retain selected files online. The cache uses SAS disk drives in a high performance RAID 50 configuration or high endurance SSDs, depending on the model.

Functionality

Standard File Interface – The archive server accepts all file types – from an MXF to a WORD document - and presents them in a single Windows file/folder structure. Files are written to and retrieved from the archive as though from a standard disk-based volume or network share. **Benefit:** works with most applications natively.

Object Storage Interface – In addition to the file system interface, an XML interface is provided. The XML instructions include the ability to pull assets from and push assets to a specified location, the option to batch and prioritize jobs and obtain job status. **Benefit:** easily allows third party applications to directly control and monitor the archive system.

Windows and Mac Compatibility – Windows and Mac OS X clients are natively supported. **Benefit:** no need to load software on client computers.

Standard Network Protocols – The solution is optimized for CIFS/SMB and FTP file transfers. Furthermore, it supports connectivity to a SAN. **Benefit:** works with the most common network protocols used in media and entertainment.

Manages Near-line Disk, Near-line & Offline Tape – The administrator defines policies for disk caching that can be tailored for different file types and folders. **Benefit:** Frequently accessed files may be retained on disk.

Supported Tape Formats – LTFS and TAR. **Benefit:** avoids proprietary formats and vendor lock-in.

Self-Describing LTO Cartridges – Each LTO cartridge contains all the file system metadata necessary to recover all the files stored on it. **Benefit:** LTO cartridges easily transferred between archive systems.

LTO Cartridge Replication – The software automatically generates replica LTO cartridges that may be exported from the library for off-site retention. **Benefit:** provides strong data protection.

End to End Verification - A read head that follows the write head is used to verify the data just written. **Benefit:** this provides an automated check-sum operation for all data written to LTO.

Supports LTO Cartridge Spanning – The Administrator defined policies can be set to allow or prevent files being spanned across multiple LTO cartridges. Additionally, the transfers of multiple files and folders will be automatically spanned across multiple cartridges. **Benefit:** archive operations are not limited by the capacity of individual LTO cartridges unlike most basic LTFS systems.

Dynamic Expansion of LTO Cartridge Groups – The system will dynamically expand LTO cartridge groups to meet capacity demands. **Benefit:** system runs automatically without need for administrator intervention.

Optimized Restores – The system restores a queue of files in the shortest possible time. The restore requests are processed in an order that minimizes unnecessary tape movement. **Benefit:** greatly decreases total restore time when restoring multiple small files.

File Version Control – The software provides comprehensive file version control. **Benefit:** deleted files and old file versions may be restored from LTO (unless the files have been purged using a repack operation).

Partial File Restore - With very large files there is often a need to read only a portion of the file. For example, this frequently occurs with multi-gigabyte video files when a short clip is requested. The XenData object storage interface is available with partial file restore (PFR) based on timecodes. In addition, the XenData file system interface supports PFR based on byte offset which when combined with applications such as a Dalet media asset management system provide a timecode based PFR solution. **Benefit:** reduces time to restore short clips.

Repack of LTO Cartridges – This copies only current files, excluding deleted files and old versions of files, to new LTO cartridges.

Benefit: permits recovery of capacity from rewritable LTO cartridges.

Metadata Backup and Restore – A file system metadata backup and restore utility is provided. **Benefit:** rapid system restore in case of rebuild after disk failure.

Alert Module – A software module is included which provides e-mail and on-screen alerts. These are tailored to the needs of archive system operators, system administrators and IT support personnel. **Benefit:** ideal for cartridge management and instant notification of any problems.

Cartridge Contents and Search Reports – The files contained on any cartridge, including offline cartridges, can be listed in a report. Additionally, search reports list all the files and their LTO cartridge barcode locations that match a user-defined search term. The reports may be exported to Excel for further analysis. **Benefit:** useful archive management tool.

Industry Standard File Security – The appliance runs Windows Server 2012 R2 Standard Edition and integrates fully with the Microsoft Windows security model based on Active Directory. **Benefit:** easy integration into an existing Windows environment.

XenData File Management Policies

The system administrator defines policies that determine where data files are physically stored on the digital archive. These policies support hierarchical storage management (HSM) and automatic tape cartridge replication.

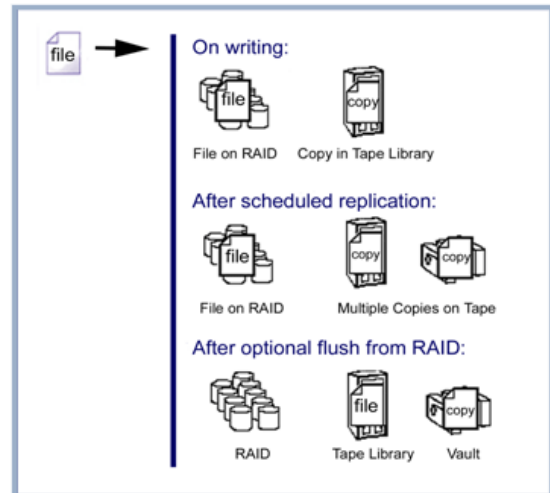
SX-550 Series Archive Servers supports three main levels of storage hierarchy:

- ❖ Online with one instance of a file on disk and, in addition, there will typically be one or more instances on LTO. In this case the file will be retrieved from disk when accessed over the network.
- ❖ Near-line with at least one instance of a file on an LTO cartridge within the library and no instance on disk. When a near-line file is accessed over the network, the XenData software automatically transfers the file from LTO to disk cache. As soon as the file transfer to disk commences, the file transfer over the network also starts.

- ❖ Off-line with no instance on disk and one or more instances of a file on LTO cartridges, all of which have been exported from the tape library.

Data protection is achieved by automatically generating multiple instances of a file. The XenData SX-550 Series archive servers can automatically produce copies of LTO cartridges which may be exported from the tape library and retained off-site.

An SX-550 Series Archive Server may have many different policies, tailored to the needs of the different file types that are being archived. A typical XenData file management policy is illustrated in the diagram opposite. On writing a file, it is first written to disk. As soon as the file has been successfully written to disk, it is put into a queue to be written to a primary tape cartridge. After completion of this operation, there are two instances of the file – one on disk and one on tape. Tape cartridge replication is optional and is scheduled according to an administrator policy.



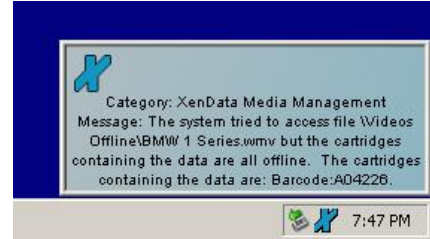
The administrator can configure the system such that after a file has been securely written to LTO, the instance stored on disk will be flushed (deleted and replaced by a sparse file, often called a stub file) to release the disk space that was occupied by the file. Files are available to users even if they have been flushed from disk and are only stored on LTO. Flushing from disk does not affect the location of a file within the file system or make it inaccessible in any other way; the only impact of flushing is to increase the time taken to read the file because it first has to be retrieved from LTO. After a file has been flushed from disk, its off-line attribute bit is set and the file is still available from LTO within the library. The Microsoft off-line bit changes network timeout periods to allow retrieval of the file from media with long access times.

On reading from LTO, a file is automatically restored to disk as it is simultaneously transferred over the network. This use of caching for restores ensure that the LTO tape drives provide fast transfers even if the network connection becomes slow.

Offline LTO Management

The SX-550 Series manages an unlimited number of LTO cartridges that have been taken entirely offline. This means that the capacity of the archive effectively becomes infinite. It also means that operator intervention is required to move LTO cartridges from the shelf to the library when there is a need to restore an offline file.

When a file is taken offline by exporting all the LTO cartridges that contain that file, it continues to be shown in the archive file/folder structure. However, this is not the complete file; it is a sparse file which has the same attributes as the complete file, such as reported size, modification date, etc. When an offline file is accessed by a program, a message is returned immediately that identifies that the file is not available. Also the XenData software puts a message in the Windows Event Log and optionally sends an e-mail and/or on-screen message that identifies which LTO cartridges contain the requested file. This notification allows the correct cartridge to be easily identified and then imported back into the LTO library. The file will then be automatically restored when the read request is retried.



The SX-550 includes four utilities to keep track of the relationship between files in the file system and their physical storage locations:

- XenData History Explorer, a plug-in to Windows Explorer, provides a file system view of the archive which identifies the physical locations of all instances of all files including old versions of files and deleted files. It identifies the barcodes of all tapes that contain a particular file.
- XenData Volume View, a plug-in to Windows Explorer, allows the user to browse the file and folder structure stored on any LTO tape.
- XenData Tape Cartridge Contents Reports which list the contents of any tape cartridge and allows export of the report to an Excel spreadsheet. This is illustrated opposite.
- XenData File Search Reports which list all files that meet user-specified criteria and identify the barcodes of the cartridges that contain those files. The results of this report may also be exported to Excel.

No	File Name	Generation	Version	FileSize (bytes)	Type
1	/test_01/foreign test files/Spanish/Español.xml	0	1	52,893	Current
2	/test_01/foreign test files/Spanish/Realmente versión 3.xml	0	1	52,893	Current
3	/test_01/foreign test files/Russian/Русский Язык/Книга1.xls	0	1	17,920	Current
4	/test_01/foreign test files/Russian/Русский Язык/Книга2.xls	0	1	17,920	Current
5	/test_01/foreign test files/long file names/Copy of New Wordpad Document_New Wordpad Document_New Wordpad Document_New Wordpad Document106.doc	0	1	4,484	Current
6	/test_01/foreign test files/long file names/New Wordpad Document_New Wordpad Document_New Wordpad Document_New Wordpad Document106.doc	0	1	4,809	Current
7	/test_01/foreign test files/long file names/New Wordpad Document_New Wordpad Document_New Wordpad Document_New Wordpad Document106New Wordpad Document_New Wordpad Document_New Word145.doc	0	1	8,755	Current
8	/test_01/foreign test files/German.lproj/Apple Qmaster User Manual.pdf	0	1	640,484	Current

LTO Interchange with XenData6 Workstation Systems

In addition to interchangeability with third party systems that use the LTF5 format, LTO tapes written in either LTF5 or TAR may be interchanged between a tape library managed by a SX-550 Archive Server and a low cost tape drive system managed by XenData6 Workstation software running on a Windows workstation.



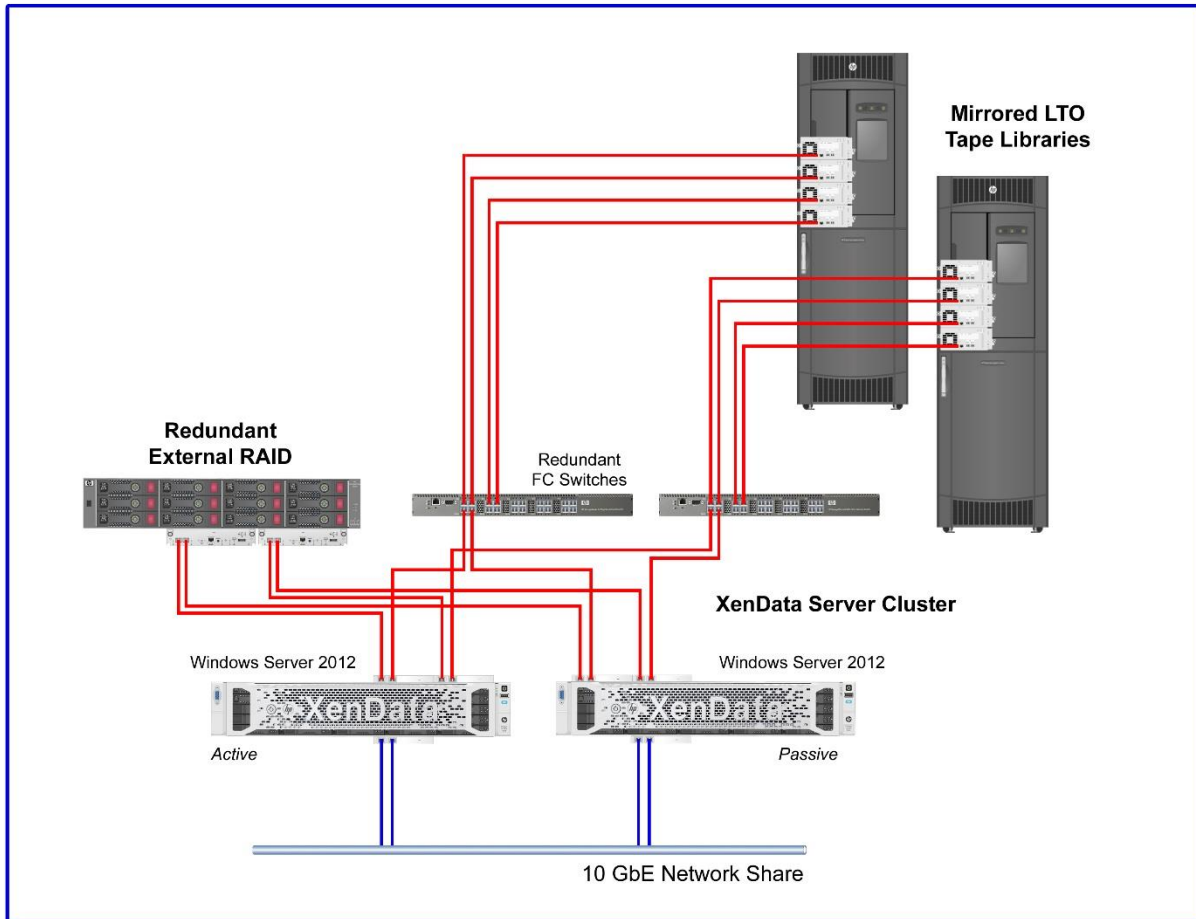
This opens up a number of useful workflow options. For example the SX-550 Archive system can be configured to create duplicate LTO tapes and, when full, one replica can be exported from the tape library and send to an offsite location having a XenData6 Workstation system. This creates a low cost disaster recovery site. Another workflow option is to archive files to LTO tape using one or more XenData6 Workstation systems and then transfer the LTO cartridges to a tape library managed by an SX-550 Series Archive Server. Many terabytes of files can be made available on the SX Archive Server within minutes.

SX-550 Series Archive Server Models

The SX-550 Series Archive Servers are available in five models. Four have a non-clustered configuration:

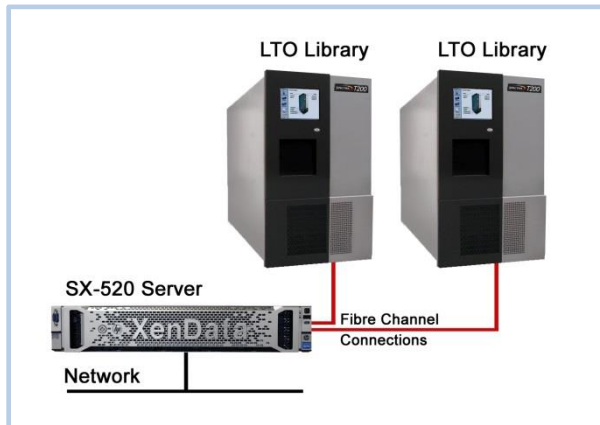
Part Numbers	RAM	Processors	PCIe slots	Base RAID Configuration	RAID Controller Cache	Base Archive RAID Capacity	Max Archive RAID Capacity
SX-551	32 GB	Single Xeon® 8 core processor	3	6 x 1.2 TB SAS drives in RAID 50	2 GB	4.8 TB	26.4 TB
SX-552	64 GB	Two Xeon® 8 core processors	6	8 x 1.2 TB SAS drives in RAID 50	2 GB	7.2 TB	26.4 TB
SX-553	64 GB	Two Xeon® 8 core processors	6	For use with external RAID	N/A	Determined by external RAID	Determined by external RAID
SX-554	64 GB	Two Xeon® 8 core processors	6	8 x 800 GB High Endurance SSDs in RAID 5	N/A	5.6 TB	18.4 TB

The SX-555 is a server cluster which provides high availability. It supports one or more LTO libraries connected via fibre channel and includes two servers running Windows Server 2012 R2 in a clustered configuration with a fully redundant RAID cache. When configured with two LTO libraries, it provides a fully redundant archive system: any single component can fail and it will continue to archive and restore.



Example SX-555 Configuration with Mirrored LTO Tape Libraries

Mirroring Files Across Tape Libraries



All SX-550 Series models will manage multiple LTO libraries and may be configured to mirror files – and tape cartridges - across tape libraries. This is achieved by using an A-B sequence of barcodes, such as: 00001AL7, 00001BL7, 00002AL7, 00002BL7, etc. The blank ‘A tape cartridges’ are imported into one library and the ‘B cartridges’ are imported into the other library. The SX-550 will automatically match the A-B cartridge pairs and replicate files across them.

SX-550 Installation Specifications

	SX-550 Series Server
Dimensions (19" rack mount)	
Height	2U
Width (inches)	17.54
Depth (inches)	26.75
Power requirements	
Number of power supplies	2
Voltage (Volts AC)	100-240
Frequency (Hz)	50-60
Peak Power Requirement (Watts) each power supply	800
Weight	
Max weight (lbs)	51.5
Ventilation	The server takes air in the front and exhausts at the rear. Un-obstructed air flow should be provided.

SX-550 Interface

	SX-550 Series Archive Server
USB Connections	
Rear	2 x USB 3.0
Front	1 x USB 3.0
Network Connections	
Standard	Four Gigabit Network Adapters are supplied as standard
Option	Dual 10 Gb/s ports may be added
Network Protocols	
Supported protocols	CIFS/SMB and FTP

Support

The SX-550 Archive Server comes with 12 months of support. This includes system support from XenData via phone and email and onsite support for the server hardware. In addition all XenData software updates are provide free of charge during the maintenance period.

Further Information

For further information, please contact XenData.

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