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XenData® Product Brief:

SX-250 Archive Server for LTO

An SX-250 Archive Server manages a robotic LTO library creating a digital video archive that is 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. The SX-250 systems scale to 540 TB of near-line LTO capacity.

Introduction

The SX-250 archive server manages a robotic LTO library with up to two internal LTO drives. It is available in 14 standard configurations - supporting an LTO tape library with a maximum of 90 slots and two internal SAS or Fibre Channel LTO-6 drives, providing up to 540 TB of near-line LTO capacity.


The SX-250 runs XenData6 Server software on a Windows Server 2012 R2 operating system. 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-250 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 direct data flows to edit storage.

The LTO cartridges written using the SX-250 are in either LTFS or TAR format. They are self-describing and may be transferred between systems running XenData6 Server and XenData6 Workstation software. When configuring a pool of tapes, the administrator selects either TAR or LTFS as the cartridge format. The system supports a combination of LTFS and TAR cartridges. With the LTFS format, cartridges may be transferred between the SX-250 and a wide range of third party systems.

The SX-250 includes a solid state system disk and a 6 TB disk cache which is used to enhance archive and restore performance and may also be used to retain selected files on disk. The base model SX-250 may be upgraded to mirror each of these disks, providing redundancy for enhanced availability.

Archive Configuration
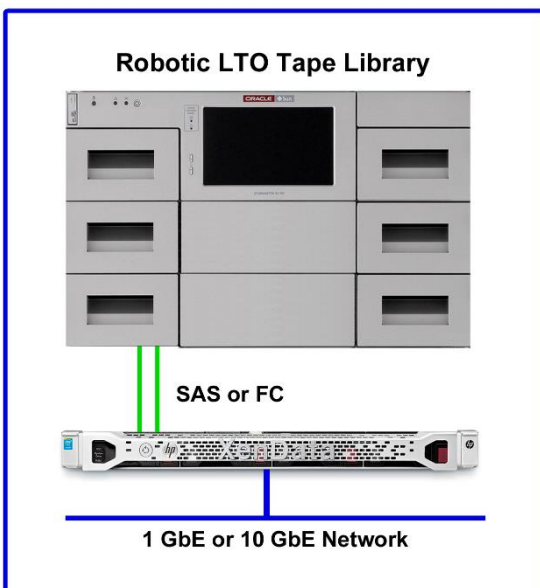
The SX-250 connects directly to the LTO library via SAS or Fibre Channel cables.

It connects to an Ethernet network via 1 GbE or 10 GbE. The network share supports the standard Windows network protocol (CIFS/SMB) and FTP file transfers. The base SX-250 includes two 1 GbE network ports and a spare PCIe slot which may be used for an optional 10 GbE interface card. Alternatively the PCIe slot may be used for an optional Fibre Channel interface card for connection to a SAN.

In addition to Ethernet and SAN connectivity, the SX-250 includes two USB 3.0 connections that may be used to locally connected storage devices allowing files to be transferred locally between the USB device and LTO.

Functionality

Standard File System Interface - The digital archive accepts all file types 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 drive.

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 a source location and push them back to that location. The instructions are sent and received from a network socket (port 3466).

Standard Network Protocols - The solution is optimized for CIFS/SMB and FTP, as well as local file transfers.

Manages Nearline Disk, Nearline & Offline Tape - The administrator defines policies for RAID caching that can be tailored for different file types and folders.

Supported Tape Formats – LTFS and TAR - The system may be configured with tape pools using the LTFS or TAR format

Self-Describing LTO Tapes - Each LTO cartridge contains all the file system metadata necessary to recover all the files stored on it.

LTO Cartridge Replication - The software automatically generates replica data tape cartridges that may be exported from the library for off-site retention. Furthermore the tapes may be rapidly imported into a replica DR system.

End-to-End Verification – A read head that follows the write head in each LTO drive is used to verify the data just written. **Benefit:** 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. This option is particularly useful when very large files are being archived.

Multiple Tape Pool Support - The software allows groups of file to be allocated to specified groups of LTO cartridges. The Administrator defined policies can be used to group related files together on the same set of cartridges.

Dynamic Expansion of LTO Pools - The system will dynamically expand LTO cartridge pools to meet capacity demands, minimizing system administration.

Optimized Restores - The system restores a queue of files in the shorted possible time. The restore requests are processed in an order that minimizes unnecessary tape movement.

File Version Control - The software provides comprehensive file version control. 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.

Repack of LTO Cartridges - This copies only current files, excluding deleted files and old versions of files, to new LTO cartridges. Benefits: permits recovery of capacity from rewritable LTO cartridges. Note that this functionality is not available when using WORM cartridges.

Transfer of Content between Systems - Export and import functions allow content to be easily transferred from one location to another.

Supports WORM Tape – XenData systems support both standard rewritable cartridges and unalterable WORM cartridges. The use of unalterable WORM cartridges is especially important for legal compliance applications.

Metadata Backup and Restore - A file system metadata backup and restore utility provides rapid system restore in case of rebuild after RAID 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.

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.

System Upgrade - Upgrading to a later generation of LTO is a very cost effective way to increase the size of an existing archive. XenData archive software makes for easy system upgrades, going from an older to a later generation of LTO.

Industry Standard File Security - The file server runs Windows Server 2012 R2 and integrates fully with the Microsoft Windows security model based on Active Directory.

XenData File Management Policies

The system administrator defines policies that determine where files will be physically stored on the digital archive. These policies support hierarchical storage management (HSM) and automatic LTO cartridge replication. The SX-250 supports three main levels of storage hierarchy:

Near-line disk with one instance of a file on the 6 TB disk cache 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 LTO with at least one instance of a file on an LTO cartridge within the library and no instances on disk. When a file on near-line LTO is accessed over the network, the XenData6 Server software automatically transfers the file over the network directly from LTO in response to the network read request. In addition, the file is simultaneously transferred to the disk cache.

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

No matter where a file is held in the storage hierarchy, its position in the archive file/folder system does not change. When a file is flushed and it transitions from near-line disk to near-line LTO, the file path, file name and properties do not change, except the Microsoft offline attribute changes to identify that the file is no longer on disk. When a file moves from near-line LTO to being offline because the LTO cartridge on which it is stored is exported from the tape library or ejected from an external tape drive, the file also remains unchanged in the archive file system.
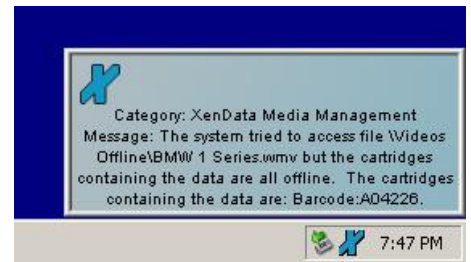
The XenData file management policies are defined by the administrator using the XenData Management Console which is shown opposite. The SX-250 may have many different policies, tailored to the needs of the different file types and folders that are being archived.
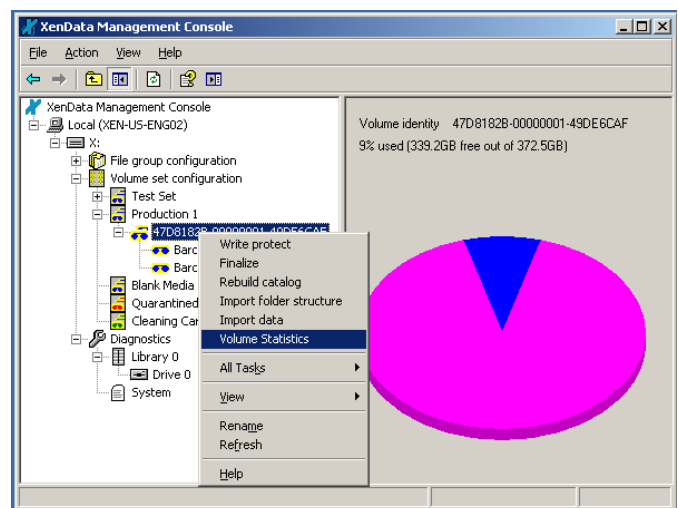
Offline LTO Management

An SX-250 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.

Category: XenData Media Management
Message: The system tried to access file \Videos Offline\BMW 1 Series.wmv but the cartridges containing the data are all offline. The cartridges containing the data are: Barcode:A04226.

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Performance

The SX-250 is suitable for archiving up to about 5 TBs of video assets per day to replicated LTO cartridges. Up to 10 TBs of video assets may be restored per day. The graph below shows the sustainable transfer rates for files ranging from 1 GB to 100 GB in size.
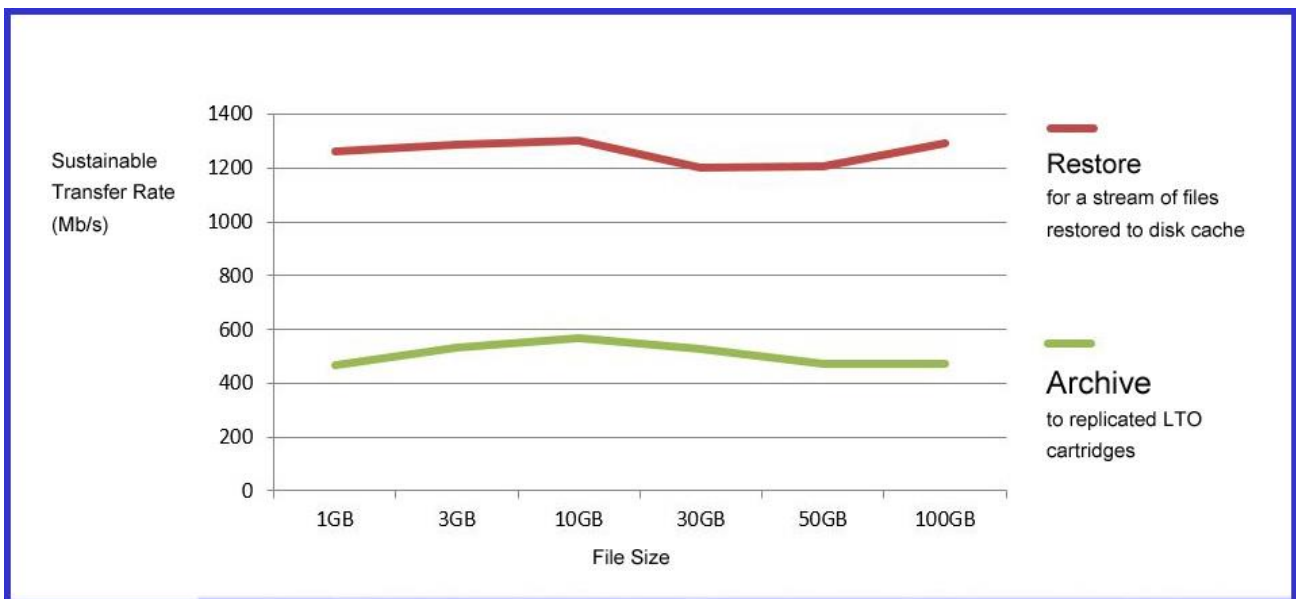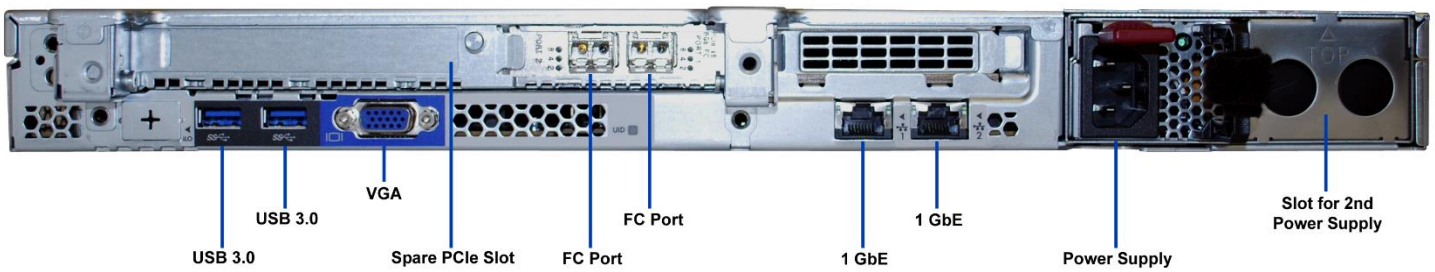
Connections

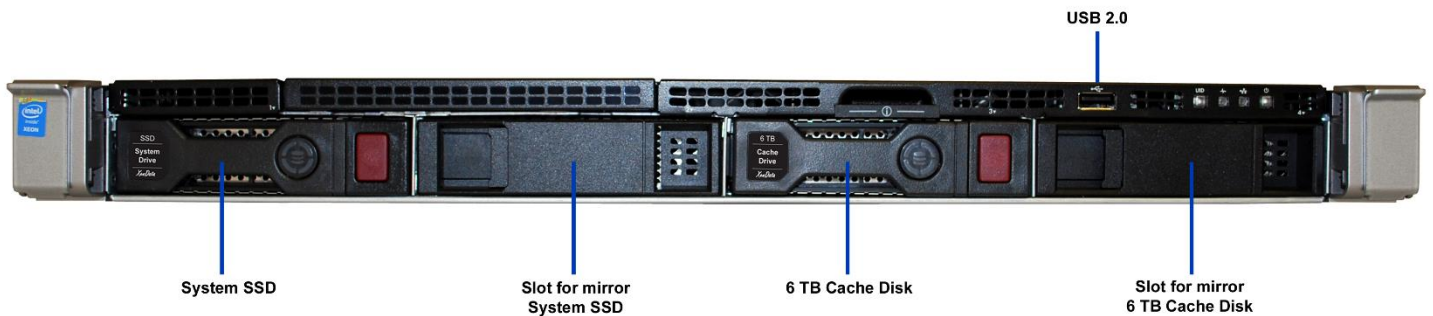Connections to the rear of the SX-250 archive server are shown below.

Models with SAS connections to the LTO Library
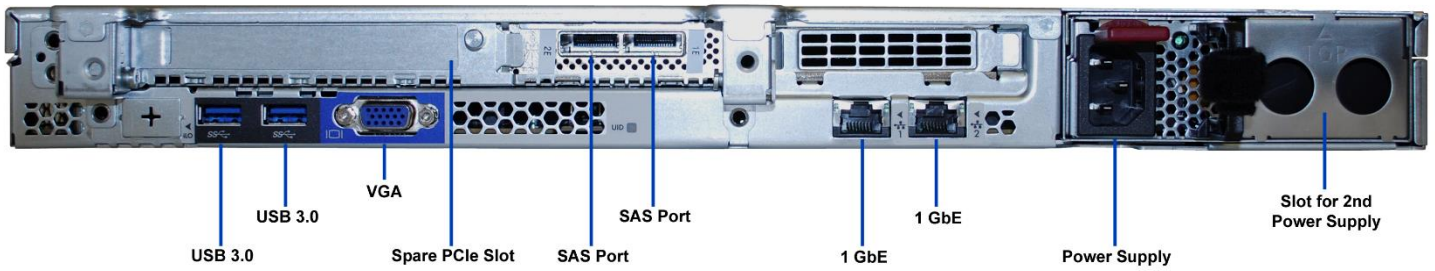
Models with Fibre Channel connections to the LTO Library

The front of the SX-250 includes a USB 2.0 connection, shown below:

SX-250 Models

The SX-250 is available in 14 base models, with either SAS or fibre channel library connections and licensed to support the following LTO library configurations:

Model	XenData SKU	Library/Drive Connection	License Support
SX-250-053	222053	SAS	One external LTO drive with either SAS or USB connection
SX-250-002	222002	SAS	Two external LTO drives with either SAS or USB connections
SX-250-003	222003	SAS	One LTO library with one internal LTO drive and up to 25 slots
SX-250-004	222004	SAS	One LTO library with two internal LTO drives and up to 25 slots
SX-250-005	222005	SAS	One LTO library with one internal LTO drive and up to 50 slots
SX-250-006	222006	SAS	One LTO library with two internal LTO drives and up to 50 slots
SX-250-007	222007	SAS	One LTO library with one internal LTO drive and up to 90 slots
SX-250-008	222008	SAS	One LTO library with two internal LTO drives and up to 90 slots
SX-250-013	222013	FC	One LTO library with one internal LTO drive and up to 25 slots
SX-250-014	222014	FC	One LTO library with two internal LTO drives and up to 25 slots
SX-250-015	222015	FC	One LTO library with one internal LTO drive and up to 50 slots
SX-250-016	222016	FC	One LTO library with two internal LTO drives and up to 50 slots
SX-250-017	222017	FC	One LTO library with one internal LTO drive and up to 90 slots
SX-250-018	222018	FC	One LTO library with two internal LTO drives and up to 90 slots

A wide range of LTO tape libraries are supported. Please refer to the XenData web site for a complete and up to date list. Following initial purchase, the license may be upgraded at a later date.

Specifications – base configurations

Archive management software:	XenData6 Server
Notification software:	XenData Alert Module
Operating system:	Microsoft Windows Server 2012 R2 Essentials
Processor:	Intel® Xeon® 6-core processor
RAM:	32 GB
System disk:	240 GB SSD
Cache disk:	6 TB SAS 7,200 rpm
Network connections:	2 x RJ45 connectors; 1000BASE-T, 100-BASE-TX, 10BASE-T
USB connections (rear mounted):	2 x USB 3.0
USB connection (front mounted):	1 x USB 2.0
SAS connections to library (SAS models only):	2 x SFF-8088 connectors; 6 Gb/s SAS
FC connections to library (FC models only):	2 x LC type connectors; 8 Gb/s
Number of power supplies:	1
Power:	100-240V; 50-60 Hz; 6.2-4.1 Amp max
Operation temperature:	50-95°F (10-35°C)
Operation humidity:	8-90% non-condensing
Form factor:	1U, 23.9" deep
Dimensions (HxWxD):	1.7" x 17.1" x 23.9" (42.9mm x 434.6 x 607.6mm)
Weight:	25.4 lbs (11.5 Kg)
Rack rails:	Included

Upgrade Options

XenData SKU	Description
	Connectivity Options
101048	Dual port 10 GbE network adapter HP 560SFP+ pre-installed in SX-250. This adds two 10 GbE ports to the SX-250 and uses the spare PCIe slot. Transceivers not included.
101057	SFP+ 10 Gb/s LC Short Range Transceiver for insertion in SKU 101048. HP part number J9150A. Quantity 2 required to use both 10 GbE ports in the adapter.
107130	Dual port 10 GbE network adapter for use with standard CAT6 or UTP cabling pre-installed in SX-250. It is an HP model 561T adapter and uses the spare PCIe slot.
101023	Fibre Channel adapter pre-installed in SX-250 for FC SAN connectivity. Provides two 8 Gb/s FC ports with LC type connectors. Uses the spare PCIe slot.
	Redundancy Options
222002	Additional power supply for SX-250, providing redundancy.
222050	Disk Redundancy Upgrade. Includes an additional 6TB cache disk and system SSD which are pre-installed and configured as mirror disks.
	Performance Option
222051	32GB of additional RAM pre-installed in the SX-250, taking the total RAM capacity to 64GB.

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Moving Image Tools and Technology

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Additional Information

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