



XenData Solution Brief:

Archiving to LTO with Harmonic Media Application Server and ProXplore

Summary

Harmonic Media Application Server (MAS) provides management of content across the Harmonic server and storage infrastructure. This includes Harmonic's Spectrum, MediaDeck and MediaGrid products. Now, the managed storage infrastructure may be extended to include XenData LTO archive systems. LTO data tape is the ideal long-term storage medium because it provides huge capacities at lower cost with less energy consumption than alternative storage technologies; yet it is fast, has high reliability, exceptional data protection and long archival life.

XenData LTO systems provide comprehensive management of the archive. Functionality includes automatic creation of replica LTO cartridges delivering strong data protection, management of both near-line and offline cartridges, multiple tape pool support, tape repack for cartridge capacity recovery and intelligent barcode management. Furthermore, a XenData LTO archive may be used simultaneously by other applications in addition to MAS.

Powered by Harmonic MAS, Harmonic's ProXplore is a web application which provides content management across the Harmonic and XenData storage infrastructure. ProXplore provides multisystem searches, content movement, and organization of content based on physical or descriptive properties. It is ideal for managing your valuable assets and turbo-charging your workflows.

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1. Introduction

The server and storage infrastructure managed by Harmonic Media Application Server (MAS) is now extended beyond Harmonic's product range to include XenData LTO archive systems. This brief describes the combined solution and the associated benefits.

2. Why LTO?

LTO data tape is the ideal storage medium for long-term retention of video files. LTO (Linear Tape Open) is the dominant data tape format used today in the IT industry for data protection and disaster recovery and will likely remain so for many years to come.

For long-term archiving of video assets, it has many advantages relative to disk based solutions:

- Less expensive, less energy consuming and lower total cost of ownership
- High long-term reliability and exceptional data protection
- Strong immunity from viruses, malware and data lost through operator error
- Archive data life of at least 30 years

The current generation of LTO (LTO-5) provides huge storage capacities: each cartridge has a 1.5 TB native capacity, equivalent to about 65 hours of content at 50 Mb/s.

The Harmonic-XenData solution described here supports both near-line and offline LTO tape cartridges. Near-line refers to LTO cartridges held in a robotic tape library or a stand-alone LTO drive; whereas, offline refers to LTO cartridges stored 'on the shelf'.

LTO tape storage systems have low power consumption. However, the ultimate energy savings come from offline retention, because most of the time the offline LTO cartridges consume no energy! In addition, no special environmental storage is required as LTO cartridges have an archival lifetime of 30 years under normal office conditions.

A key advantage of including LTO in the storage infrastructure is for data protection and disaster recovery. LTO cartridges are highly reliable and, because the cartridges are inexpensive, it is cost effective to mirror your video files on replica LTO tapes. A copy of each LTO cartridge may be exported from the robotic tape library and retained in an offsite location for safe keeping.



Because files are written sequentially to LTO and the system does not have the ability to alter data already archived to a cartridge, LTO has high immunity to viruses and malware. It even provides protection against accidentally deleted or over-written files because deleted data can easily be recovered from a cartridge.

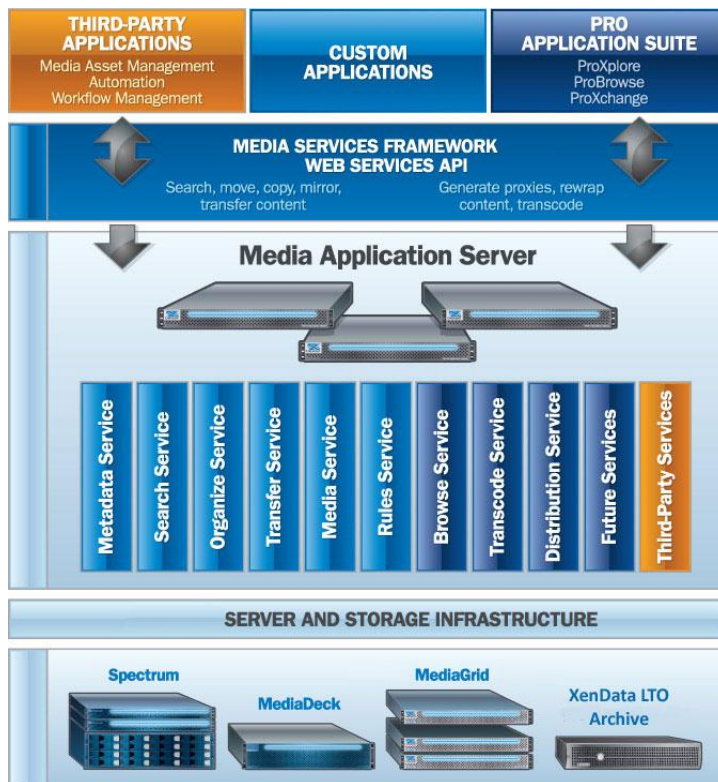
LTO drives and cartridges are manufactured by multiple companies which are committed to a future product road map that ensures long-term support and backwards compatibility for the format. LTO tape drives are backwards compatible with the last two generations of LTO cartridges. For example, today's LTO-5 drives will read and write LTO-5 and LTO-4 cartridges and have read-only compatibility with LTO-3 tapes. LTO-6 drive availability is scheduled for 2012 and the drives will provide read and write compatibility with 3 TB LTO-6 cartridges, 1.5 TB LTO-5 cartridges and will have read compatibility with 800 GB LTO-4 cartridges

3. Harmonic Media Application Server

3.1 Simplifying the Media Application Environment

Harmonic MAS minimizes the complexities of media management by combining a single virtualized view of content across managed storage systems. It provides centralized search capabilities and centrally defined workflows.

Media Application Server is delivered as a software and hardware appliance, which provides a collection of services for both managing and processing media.



3.2 Built-In Media-Aware Services



MAS includes Foundation Services that provide fundamental functions for managing media across the Harmonic and XenData server and storage infrastructure such as metadata management, transfer services and system-wide searches.

The Metadata Service automatically pre-populates the integrated database with properties not found in generic systems such as bit rate, resolution, wrapper type and video format. The Metadata Service also supports extensive customization, allowing the server to support the unique data requirements of each organization, from tracking episodes and seasons to sponsor and distribution agreement information.

MAS includes a centralized rules and notification engine which powers the automated processing and routing of content across Harmonic and XenData systems. Content processing and movement takes place as quickly and reliably as possible, yet still supports workflow steps that require human intervention and approval.

Applications powered by the Media Application Server are available to the entire enterprise using standard browsers for easy deployment and administration. Every user of the Media Application Server is assigned a role which determines the features they are authorized to access and the set of tools available to them.

Optional application services provide media processing capabilities and include:

- *Proxy Service* A powerful automatic proxy generation service links low-res proxies to the corresponding full-res content and maintains metadata integrity. It enables viewing of content over standard corporate networks, VPN or Internet connections.

- *Transcode Service* This provides the fastest video transcoding on the market by leveraging the Grid Processing capability of the MediaGrid clustered storage system.

3.3 Highly Scalable

Media Application Server is designed to scale to support massive client seat and content requirements. Systems are available pre-configured for redundant or clustered operation, or can be added as requirements evolve.

4. Harmonic ProXplore

4.1 Clip and Metadata Management Application

Powered by the Media Application Server, ProXplore enables organizations to manage their digital media workflow, enforce business rules, and streamline the flow of content through the facility. It is a web application for clip and metadata management across Harmonic and XenData systems. It optimizes digital media workflows by supporting multisystem searches, facilitating efficient content movement, and enabling content organization based on physical or user-defined metadata properties.

4.2 Managing Valuable Assets through Metadata

Metadata is key to managing media content in a file-based workflow. ProXplore uses structural and descriptive metadata to enable efficient access to and reuse of existing content, reducing the costs associated with locating or reacquiring material. ProXplore automatically interrogates all managed systems to extract metadata such as format, bit rate, resolution, frame rate and wrapper type, and leverages that data to streamline the organization and location of content. Users can tailor metadata models to their precise requirements, employing unlimited fields and numerous field types for assets, clips, sub-clips, clip sequences, tracks and even individual frames to ensure accurate content organization and consistent search results.

Virtual folders organize content hierarchically or in groupings based on genre, content type, project or workflow stage. Drawing on content stored across the system, virtual folders can be dynamically populated with the result of a saved search to provide content required for a specific user or task. Metadata fields created in relation to virtual folders enable context-specific metadata based on category, ensuring that content organization is unrestricted by a single system-wide metadata model.

4.3 Turbo-Charge Workflows

Workflow efficiency is optimized by ensuring content is automatically moved to the next step whenever possible. ProXplore monitors files using configurable rules triggered by system activity or time; it senses static and growing clips, and intelligently determines the most efficient transfer protocol for each job, even when content is still being acquired or is already being edited. Rules can guide the automatic synchronization of folders, mirroring of multiple systems, transfer of clips, movement or deletion of content, and generation of notifications to users or third-party systems.

Rules also can trigger activity according to system timers or event notifications, such as the discovery of a new clip or completion of a transfer. ProXplore can determine the most appropriate type of transfer based on the properties of the clip, the workflow step and the urgency of the transfer. The supporting infrastructure can be configured to ensure timely content transfers and mirroring, and to provide redundancy by load-balancing tasks across available resources. Automatic rewrapping of content during transfers facilitates new workflows, such as automated rewrapping and transfer of content from ingest to edit to transmission.

5. XenData Archives

XenData archives that are compatible with Harmonic MAS include the SX-10 Archive Appliance and the XenData SX-500 Series Archive Servers. They attach to an Ethernet network and manage robotic LTO tape libraries to provide comprehensive management of an LTO archive. The XenData archive includes a disk cache for enhanced performance.

By adding XenData's Harmonic MAS integration software module, the LTO archive system is brought under the control of the Harmonic Media Application Server. This allows MAS and ProXplore to search for and move assets across the Harmonic-XenData storage infrastructure.

In addition, the XenData archive may be simultaneously used by other systems. For example, a tape pool may be used by a workgroup of NLEs for archiving sequences or projects; another tape pool may be used to archive P2 or similar content.

5.1 Comprehensive LTO Management

The XenData archive includes the following capabilities.

- *MAS and File System Interface* - The archive accepts all file types, allowing archive and restore operations via FTP under control of MAS. In addition the archive may be accessed as a Windows file system using CIFS/SMB and FTP file transfers.
- *Multiple Tape Pool Support* - The software allows groups of files to be allocated to specified pools of tapes.
- *Tape Replication* - The software automatically generates replica data tape cartridges that may be exported from the library for off-site retention.
- *Dynamic Expansion of Tape Sets* - The system will dynamically expand tape sets to meet capacity demands, minimizing system administration.
- *Prioritized and Optimized Restores* - The system restores a queue of files in the shortest possible time that is consistent with MAS prioritization. The restore requests are processed in an order that minimizes unnecessary tape movement.
- *Disk Cache Management* - The internal archive disk cache may be used to retain archived files for extended periods to further enhance performance. This is controlled via administrator defined disk retention policies.
- *Intelligent Barcode Management* - The XenData archive manages LTO cartridge barcodes and communicates barcode information to MAS.
- *Near-line and offline LTO Management* - LTO tapes may be taken entirely offline but are still managed by the XenData archive and by MAS.
- *Repack of Tapes* - A XenData repack utility permits recovery of capacity from rewritable LTO tapes.
- *Standard POSIX tar Tape Format* - The archived files are written to tape using the standard POSIX tar format. This means that, in addition to using XenData software, files may be restored using a wide range of Linux and UNIX operating systems.
- *File Version Control* - The XenData archive provides comprehensive file version control. Deleted files and old file versions may be restored from tape (unless the files have been purged using a repack operation).
- *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.
- *Tape Contents Reports* - The files contained on any tape, including offline tapes, can be listed in a report which may be exported to Excel.
- *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 archive integrates fully with the Microsoft Windows security model based on Active Directory.

5.2 Tight Integration with MAS

The XenData archive and Harmonic Media Application Server communicate via a Harmonic API. This supports file transfers, management of offline LTO cartridges and global searches.

File Transfers To initiate a file archive to LTO, MAS instructs the XenData archive to pull files from other storage devices, such as a Spectrum, MediaDeck or MediaGrid. Similarly, restores from LTO are initiated by MAS which instructs the XenData archive to push files to a Harmonic storage device. This approach is highly scalable, minimizing the bandwidth requirements for the Media Application Server. MAS defines the overall priorities for the file transfers and the XenData archive initiates the file transfers using FTP in an optimized order which is consistent with the priorities.

Managing Offline LTO MAS and the XenData archive communicate to manage offline files. Before initiating a restore from LTO, MAS communicates with the XenData archive to determine whether or not the required files are available automatically from near-line LTO. If the files are offline, the XenData archive sends barcode information to MAS that identifies which offline tapes must be brought back to near-line.

Searching The XenData archive includes a database that allows the contents of the LTO archive to be included in global searches initiated by MAS.

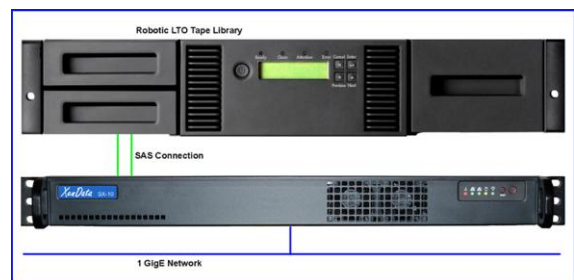
6. XenData System Options

The XenData integration module for Harmonic MAS will run on an SX-10 Archive Appliance, an SX-500 Series Archive Server or any archive running XenData6 Server software.

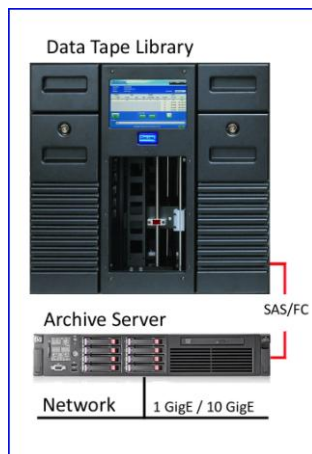
6.1 SX-10 Archive Appliance

The XenData SX-10 appliance manages a robotic LTO tape library or stand-alone LTO-5 tape drives and creates a cost effective digital video archive. It includes a 3 TB disk cache and two 1 GigE Ethernet ports.

The SX-10 runs XenData6 Server software on a Windows 7 platform and scales to 75 TB of near-line LTO. It is available in 6 standard configurations - supporting from a single stand-alone SAS LTO-5 tape drive to a 50 slot SAS LTO tape library with up to two internal LTO-5 drives.



6.2 SX-500 Archive Servers



For requirements that go beyond the SX-10 Archive Appliance, the XenData SX-500 series of archive servers provide a highly scalable and customizable solution.

The SX-500 Archive Servers high run a Windows Server operating system and manage one or more robotic LTO tape libraries or stand-alone LTO-5 tape drives. A wide range of LTO libraries is supported with SAS or Fibre Channel interfaces and capacities to multiple petabytes.

Customizable options include:

- disk cache size which may be scaled to over 100 TB of RAID
- performance which is dependent on the RAID, RAM and processor
- tape library connectivity via Fibre Channel or SAS
- network connectivity up to multiple 10 GigE ports
- Onsite support options to 24x7

7. XenData Contact Information

XenData LTO archive systems are optimized to meet the needs of the media and entertainment industry, and with LTO archive server installations in over 50 countries, XenData archives are trusted by hundreds of TV stations, video production organizations, and video service providers.

For more information, please visit our web site or contact us by email or phone.

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