XenData MX64 Edition

Product Brief:

The MX64 Edition of XenData Archive Series software runs on multiple 64 bit servers and creates a very high performance digital video archive. The software manages one or more data tape libraries and supports the leading data tape formats including LTO. A video archive running the MX64 Edition meets the most demanding needs of large broadcasters.

The solution is explained and a case study is provided which describes how it is used by one of the UK's leading broadcasters.

XenData

About XenData

XenData software creates digital video archives based on IT standards that scale from terabytes to petabytes. All XenData digital video archive solutions store video files to data tape such as LTO. A XenData system provides a standard file system interface for easy integration creating a universal digital archive that can be used by many automation, asset management system and post-production systems. It has proven compatibility with software from a broad range of companies including Apple, Blue Order, Cinegy, Crispin, Dalet, Fission Software, Gallery, NVerzion, Pharos, Pictron, Pro-Bel, TMD, Video Technics and vsn.

Further Information

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MX64 Edition for High Transfer Rates

The MX64 Edition of XenData Archive Series software is optimized for large digital video archives, meeting the most demanding needs of the broadcast industry. It runs on multiple 64 bit Windows servers that provide load balancing and a high total transfer rate. The software manages one or more data tape libraries and magnetic disk cache creating a highly scalable digital archive.

An archive running the MX64 Edition software provides the same universal file system interface as XenData's Video Edition which runs on a single Windows server. However, the MX64 Edition overcomes the performance limits of a single server and provides a high level of scalability, as the number of servers may be tailored to the total throughput requirements of the archive.

In addition to high transfer rates, the MX64 Edition provides the following key features:

- **Standard Windows File System Interface** The files stored to data tapes appear within one or more standard Windows shares. This means that one or more software applications can write to and restore from the archive as though it were a standard shared disk-based logical drive. Consequently, the archive accepts all file types, for example MPEG, MOV, AVI and MXF. The use of a standard Windows file system means that the archive provides fast connectivity to Windows clients and Apple Mac clients running OS X.

- **Strong Data Protection** The system provides the option for automatic tape cartridge replication, creating additional copies of each tape cartridge. When full, the replica tapes may be exported from the tape library and held in a secure offsite location. If required, the replica tapes can be quickly imported into a duplicate archive system.

Data Tape Formats

The MX64 Edition supports a range of data tape formats including the market leading LTO format.

	LTO-3	LTO-4
Capacity per cartridge (Native capacity i.e. without compression)	400 GB	800 GB
Equivalent hours recording per cartridge at 25 Mbps	35.5 hours	71 hours
Equivalent hours recording per cartridge at 50 Mbps	17.7 hours	35.5 hours
Maximum Data Transfer Rate in Megabytes per second (without compression)	80 MB/s	120 MB/s
Typical Specified Media Archival Lifetime	30 years	30 years

The 800 GB capacity of an LTO-4 tape cartridge is equivalent to over 71 hours recorded at 25 Mbps or 35.5 hours at 50 Mbps.

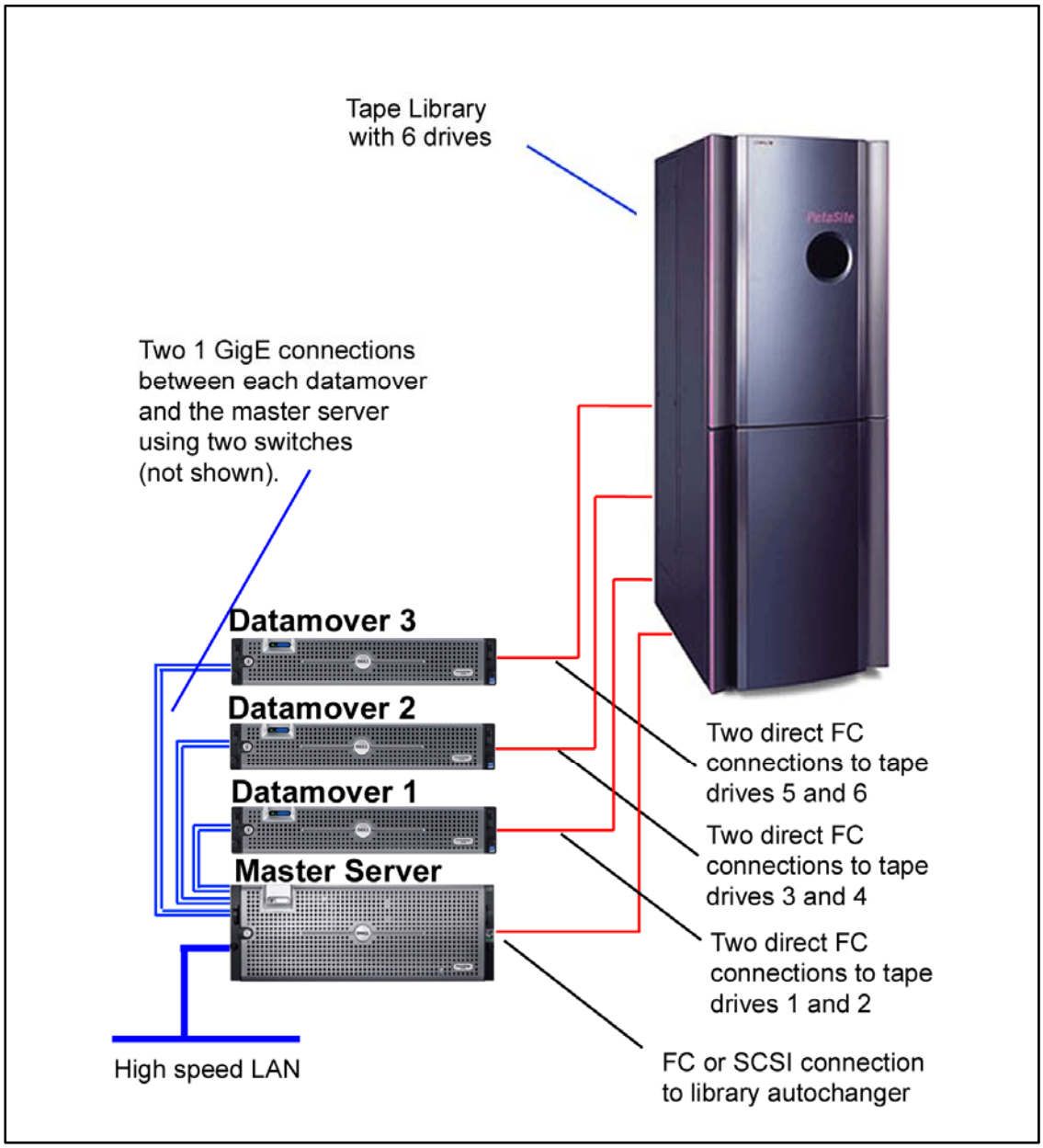
MX64 Edition Archive Configuration

The archive consists of the following components:

- one or more robotic data tape libraries
- a master server running Windows Server 2003 X64
- multiple datamover servers, each running Windows Server 2003 X64
- a private network connecting the master server to the datamovers

The master server uses RAM to act as a high speed conduit for files which are transferred between the external high speed LAN and the datamovers. By using multiple datamovers, the load is balanced across multiple servers to achieve high total transfer rates.

A typical archive configuration is shown below:



Even though multiple servers are employed, the whole archive appears as a single logical drive on the master server that runs a 64 bit edition of Windows 2003. Typically multiple 1 GigE network connections are made to the master server which may be teamed if required.

The MX64 Edition supports a wide range of tape libraries from the leading suppliers including HP, IBM, Overland Storage, Qualstar, Quantum, Rorke Data, Sony, Spectra Logic and Sun Microsystems. Also a wide range of connectivity options are supported based on Fibre Channel and SCSI. Fibre Channel is generally preferred for larger systems as it provides higher bandwidth and better reliability than parallel SCSI connections.

Archive based on IT Industry Standards

Digital video archive solutions that run XenData software are totally non-proprietary, conforming to IT industry standards throughout. Not only does the solution provide a standard Windows file system interface but it delivers the following:

- **Industry Leading Data Tape formats** - including LTO.
- **Tape Interchange Format –** the format used to write to tape is the IT industry standard TAR format. This ensures that files may be read by a wide range of third party utilities and operating systems.
- **Network Protocols** – the archive solution is optimized for standard Windows network protocols (SMB/CIFS) and FTP file transfers.
- **Industry Standard File Security**. The XenData archive system integrates fully with the Microsoft Windows security model, based on Active Directory. This makes it easy to ensure that video file access is limited to authorized users.

Seamless Integration with Windows and Mac OS X Clients

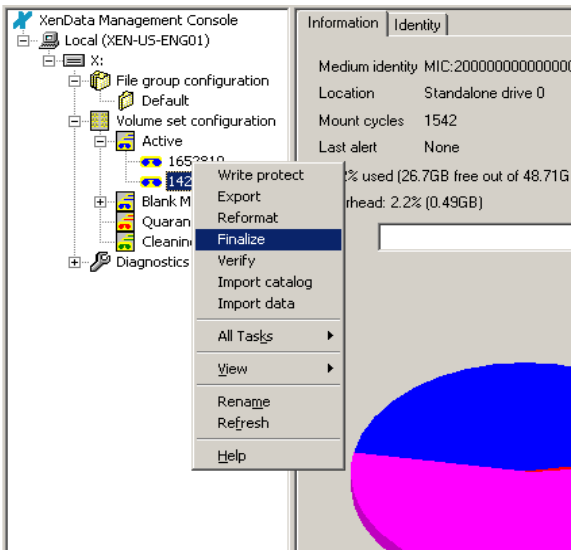
The increasing popularity of Apple's Final Cut product range has lead to many heterogeneous networks running both Windows and Mac OS X clients. OS X provides fast connectivity to XenData archives using the SMB protocol which means that a XenData archive will simultaneously work with both Mac and Windows clients.

Ease of Administration

The physical storage location of files is driven by policies set by the administrator. Options include:

- automatic duplication of data tapes
- setting file retention times on RAID cache
- grouping of files on specified tape sets

Archive administration is performed using the XenData Management Console. It is a Microsoft Management Console snap-in and provides the Administrator with a familiar and easy-to-use tool for system management.



Easy File Transfer between Archives

XenData archives running the MX64 Edition on multiple servers and those running the Video Edition on a single Windows server fully support tape cartridge interchange. When a tape cartridge becomes full, a contents catalog is automatically written to the end of the tape. The contents of a tape cartridge can be imported into a new archive by reading the catalog which takes only a few minutes.

The MX64 and Video Editions use the same contents catalog. This allows for rapid interchange of data between MX64 and Video Edition systems. It also means that an organization can start with the Video Edition and then easily migrate to the MX64 Edition.

The ability to easily and rapidly transfer tapes between XenData archive systems, whether running the MX64 or Video Edition, can be routinely used in two different ways:

- transfer of duplicate data tapes that are automatically created at a primary site to another XenData archive at a disaster recovery site
- sharing of video files between group TV stations

MX64 Edition Features and Benefits

Highly Scalable It is highly scalable in terms of overall transfer rates and archive capacity. The MX64 Edition software supports multiple datamovers for increased transfer rates and multiple tape libraries with multiple Petabyte capacities. Benefit: scales to meet the needs of the largest broadcasters.

Standard File System The entire archive appears as a standard Windows file system within a single logical drive letter. The solution uses the standard Windows offline file attribute to identify when a file is no longer online. **Benefit:** seamlessly integrates with standard applications and existing network infrastructure without modification.

Microsoft Security XenData Archive Series software is fully integrated with the Microsoft Windows security model, based on Active Directory. **Benefit:** effortlessly integrates with existing security, minimizing system administration.

Automated Tape Cartridge Replication Replication of tape cartridges is automatic and follows the policies defined by the Administrator. **Benefit:** it is easy to generate tape cartridge replicas for off-site retention for data protection purposes.

Offline Tape Cartridge Management The system retains meta-data for offline tape cartridges. **Benefit**: the system supports an unlimited number of tapes 'on the shelf'.

Partial Read of Large Files 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. XenData software supports partial reading of large files. **Benefit:** enhanced performance when dealing with large files

Multiple Tape Set Support The software allows file groups to be allocated to specified groups of tapes. **Benefit:** the Administrator can group related files together on the same set of tapes.

Open Standard Tape Format Open standard TAR file format is used on the tape, allowing the tape cartridges to be read using third party utilities. **Benefit:** the use of open standards on industry standard hardware ensures the long term availability of data.

Dynamic Expansion of Tape Sets The system will dynamically expand tape sets to meet capacity demands. **Benefit:** this minimizes system administration.

Familiar Administration File policy and tape cartridge management is performed by the Administrator using the XenData Management Console which is a Microsoft Management Console Snap-In. **Benefit:** the Administrator uses a familiar tool for system management.

Email Alerts Notification of hardware errors or archive system problems is provided by e-mail alerts and / or on-screen messages.

API Available An API is available. **Benefit:** this can be used by developers to obtain tight integration with their applications.

MX64 Edition Case Study: Channel 4, UK

One of the UK's most successful independent broadcasters has now gone live with its Media Access Project that uses an archive system running XenData's MX64 Edition.

User

Channel 4 Building, London

Channel 4 transmits across most of the UK and is available on all digital platforms (terrestrial, satellite and cable).

Channel 4 also operates a number of other services, including the free-to-air digital TV channels E4, More4 and Film4, and an ever-growing range of online activities at www.channel4.com, including the broadband service FourDocs and Channel 4's bespoke video-on-demand service 4oD. The Film4 production division produces and co-produces feature films for the UK and global markets.

Project Challenge

Channel 4 has grown substantially since its inception and wanted to advance its entire operation from video tape to file-based playout. This major broadcaster needed a file-based solution that would allow fast and efficient response to new business developments in the rapidly diversifying broadcast marketplace.

Solution Provider: Pharos

Pharos is a software systems developer that is founded on 10 years of design, development and integration of desktop control, automation and media management solutions in high-technology broadcast environments around the world. More information is available at: www.pharos.tv

Solution Key Components

- Pharos Mediator, a scalable broadcast media management system
- Omneon ingest servers
- Isilon iQ 42 TB disk storage system
- Sony PetaSite tape library with 3,000 LTO-3 tape cartridges
- XenData Archive Series software, MX64 Edition, running on four 64 bit servers

Solution in Detail

Pharos Mediator is a scalable broadcast media management system which can be configured to co-ordinate single or multiple workflows in any broadcast environment. Ingested content can be catalogued, researched, loaned and shared between users, providing collaborative working. Files can be outgested to any selected format, such as complete programs, music compilations for post-production or DVDs for local distribution. Multiple client libraries can be configured to provide security and privacy for clients without the expense and complexity of separate hardware for every client.

Incoming programs and interstitials are ingested at full 50 Mbit/s I-frame MPEG2 via Omneon ingest servers to an Isilon central online storage system. A low resolution browse copy is made simultaneously. Content is held on the Isilon storage system before being automatically transcoded to 15 Mbit/s Long GOP MPEG2 for playout via the existing Pinnacle TX server system. Using Mediator, Channel 4 is able to perform the entire broadcast operation from its online digital library store.

MXF 50i was chosen as the file format on the basis that it maintains optimal quality and is a relatively easy standard to export and to decode.

The Media Access Project uses multi-tiered storage under the control of Mediator Transfer Manager. Incoming programs and clips are digitized to Omneon ingest servers. The high resolution files are then moved onto a 42 TB (terabyte) Isilon iQ central storage server which also stores all of the low resolution browse proxies. The Isilon iQ comprises 8 nodes for immediate access to the stored material.

Another storage tier controlled by Mediator Transfer Manager is a very high capacity near-line archive consisting of four 64 bit servers running XenData software and a Sony PetaSite LTO tape library. This is currently the largest LTO PetaSite installation in Europe with 3,000 LTO-3 data tapes. It provides 1.2 PB (petabytes) of storage, capable of archiving over 50,000 hours of high resolution content recorded at 50 Mbits/s. The Sony PetaSite is managed by the MX64 Edition of XenData software which runs on a master server and three datamover servers. This configuration provides high transfer rates for archiving to and restoring from the tape library.

Sony PetaSite library containing 3000 LTO data tapes

The XenData software makes all of the archived video files appear within a single standard Windows logical drive which means that Mediator can write to and read from the archive as though it were a standard shared disk-based logical drive.

Channel 4's ingest area is equipped with quality control booths for content that needs careful eye-balling and fast-track desks for material that does not need to be viewed in real time. Both are controlled via Mediator. All ingested content is exported to the browse system at the same time as it is transferred for transmission. The browse system is used for off-air logs, for all compliance viewing and for checking of commercial break running order. A playlist function is already built in. A generic Application Program Interface is used to ensure flexible control.

The entire Media Access Project - ingest server, content store, archive manager, Petasite tape library and file transfer management - are managed by the Pharos Mediator media management system and database. Most of the system is located in the library operations area. It includes four dedicated dual VTR ingest and QC positions, Omneon online servers and the XenData / Petasite data tape archives plus all the control stations.

Mediator manages the export of video, files and metadata to any chosen destination using an XML interface for metadata. For example, outgest 1 is DigiBeta and outgest 2 is Digital Rapids Version X. Outgest to graphics is handled similarly, exporting clips directly into a Pixel Power Clarity for making promotional graphics.

mediator
media management

Material destined for issue on DVD by the Channel 4 press office is transcoded from the 50i master obtained from either the archive or the Isilon storage. A Pharos database within Mediator makes a title slate which is added to the DVD chapters. Transcoders are used to generate 15 Mbits/s long-GOP files for transmission via Pinnacle servers. All broadcast schedules for a week or more go into the Mediator and that actually drives the transcode process.

The Media Access Project was installed and went live in 2007 and meets the objective of creating and maintaining a file-based store of all programs so that they can be made available in any format the market requires.