

Masstech Case Study/White Paper Gaelic Media Service (GMS) Stornoway, Isle of Lewis, Scotland

About The Gaelic Media Service (GMS)

Seirbheis nam Meadhanan Gàidhlig, the Gaelic Media Service (GMS), is located in Stornoway on the Isle of Lewis in Scotland. The Isle of Lewis is in the northwest section of the Hebrides group of islands, also called the Western Isles. These in turn are located northwest of mainland Scotland.

In existence about 50 years, GMS is responsible for ensuring that a wide range of high-quality Gaelic television programs is available to the people in Scotland. GMS is a publicly funded body established by statute and regulated by Ofcom, the independent regulator and competition authority for the UK communications industries.

GMS funds, commissions or produces Gaelic language programs for television, radio, on-line or new media and engages in, or funds training, development and audience research. Its television programs can be seen on BBC2 and STV (Scottish television). GMS works with producers to promote development, training and the use of Gaelic as the working language of the Gaelic production sector.

In a new endeavor, GMS with stakeholder the BBC, established the Gaelic Digital Service (GDS). GMS is committed to securing GDS distribution on all digital platforms as well as a sustainable future for Gaelic broadcasting. In addition to new satellite delivered service, GMS plans to launch GDS on the digital terrestrial television (Freeview) platform once digital switchover in northern and central Scotland has been completed around 2010/2011.

While GMS maintains production and editing facilities in Stornoway, it does not originate programming from there. Transmission duties are handled by the BBC in Glasgow.

GMS Migrates to Digital

In preparation for the launch of GDS, GMS acquired videotape collections from the Gaelic News Service (about 390 Betacam SP tapes) as well as about 1300 hours of programs from the Scotland TV Gaelic language archives. These will become part of the new service's programming schedule along with new productions of documentaries, current affairs, sports,

news, and entertainment programs. These new shows are delivered to GMS on videotape and currently programs are in standard definition (SD) video.

The new service prompted GDS to upgrade its facilities and consider how best to handle its media workflow. “We wanted to do a system upgrade to do things better,” said Uisdean MacLeod, Technical Operations Manager, GMS. “We wanted to get the national heritage material ingested in some way and to bring things up to date.”

Another goal was to start moving away from a videotape-based archive to more efficient digital storage. “Being tape-based is not a good use of resources,” MacLeod said.

Migration from videotape to digital files and the advantages of a digital workflow is a gradual process. GMS required a system that could overlay its existing tape-based environment, without having to start over from scratch. The system also needed to provide ingest and digitization of new and old material, digital file storage and management, interfaces to two different non-linear editing systems, and overall management of a more complex workflow environment.

GMS also required low resolution copies of ingested material for browsing and content-checking, and an interface to its traffic and scheduling system.

These requirements were readily met by the Masstech Group MassStore suite of workflow asset management products, which were designed and installed as part of a larger system by UK systems integrator, Television Systems Limited (TSL).

MassStore System Overview

The core of the GMS digital workflow system is Masstech MassStore Workflow Asset Management (WAM) suite. MassStore interfaces to physical devices that are used to create and store content over the lifecycle of that content—VTRs, non-linear editing (NLE) systems, nearline disk-based and digital tape archive storage.

MassStore maintains an embedded database that knows where all content under its control is located, monitors for new content, deletes old content as instructed, and provides a means for entering or importing metadata (data about the content) as well as storing and tracking metadata along with the content.

MassStore effects the movement of content from one location to another, transcoding or transforming the files as needed, all the while performing these tasks automatically according to user defined rules in the Workflow Manager module. Rules can be entered into Workflow

Manager such that no further user intervention is required for MassStore to carry out its tasks. The rules can be changed at any time as user circumstances change.

MassStore performs dynamic load balancing to ensure that network pathways aren't bogged down with too much data traffic, and has security policies so that only those who are assigned can access or manipulate particular material.

Other specific MassStore modules (software plug-ins and associated hardware) help GMS increase productivity. MassStore M-Ingest allows GMS to digitize content from videotape—older archival material as well as new contributions—to a high quality, high bit-rate master MPEG2 file format, as well as enter metadata about the content. These files with their metadata are recognized by MassStore and are stored in nearline cache (spinning disk array) or a deep storage digital tape library.

Once the master content files are created and stored, they are then available for non-linear editing sessions. GMS ultimately will use two different types of NLE systems. The digital files required for an edit session can be copied over, in whole or in part, to the NLE system, and while being copied, the file format is automatically transcoded/transformed to the format used by the particular NLE system. MassStore also can copy and transform files from one type of NLE system to the other.

The MassStore WAM modules for these functions are MassTrans-It which performs the content transformation, M-Connect that interfaces between MassStore and Apple Final Cut Pro NLE, and SAvI which provides the interface to the Avid environment. At GMS SAvI connects to a Media Composer Adrenalin NLE with a single TransferManager. SAvI handles both Avid TransferManager Data Handling Module (DHM) and Dynamically Extensible Transfer (DET) file transfers.

GMS initially implemented the interface for Apple Final Cut Pro, but has SAvI installed on its MassStore system, awaiting full implementation with Avid upon completion of third party additions to the in-house Avid system.

With the Final Cut Pro and Avid interfaces, projects can be stored in native format with full metadata, and finished programs (flattened files) can be transformed back to the house master file format for further use. A proxy browse application, MassBrowse, provides an off-line means for viewing programs or clips, and selecting all or part of them for edit sessions.

MassStore Workflow Manager

Workflow from a Masstech point of view involves working with file-based content and automating the various processes required to move and transform that content throughout the many pathways it could take, over the course of its lifecycle, from the time it's ingested to final deletion. This approach eliminates most if not all of the tasks that may have been done manually.

While digitizing content through the ingest process is indeed a part of the overall workflow, it is only the beginning. The idea is to ingest once and then take that file and create a map of where it needs to go, how it's going to get there, and in what format. Configurations can be set up so that people are no longer involved in handling the content over its lifecycle, or that selected user commands can start a series of processes.

To accomplish this mapping process, GMS is using the MassStore WAM suite with its powerful Workflow Manager to describe, in user defined rules, how to process the content at every stage.

One way of looking at Workflow Manager is that it is like a director of a TV production. During rehearsals, the director works out the timing and staging of every element of the production, and marks the script with these directions. These are like the rules that are entered into Workflow Manager.

When it's time to record or air the program, the director coordinates all the elements of the production. The director calls when to "roll" a playout video server, when to insert and remove lower-third graphics, when to open and close a particular microphone, when to fade up opening theme music, when to do a squeeze-back digital effect and what type of one to do.

In an analogous way, Workflow Manager, as an integral component of MassStore, manages the automatic operations on instances of content (the digital files) located in MassStore. For example, Workflow Manager directs what format to encode content ingested from videotape, when to create a proxy and what type of proxy to create, when to move the content from nearline storage to digital tape library, when and how to move content from an archive to a non-linear editing system, and how to transcode/transform it.

The Processing Profiles of Workflow Manager are used by the application administrator to configure the way the application will process the notifications generated by various events. The commands defined in the Processing Profiles are executed when registered events occur.

GMS Workflow Summary

While there are endless workflow combinations that can be configured in MassStore, this summarizes how GMS chose to set up its file-based workflow:

- Content is digitized to a specified master house file format in M-Ingest Stations.
- Based on rules configured in Workflow Manager, content is copied to cache and stored in the digital tape library.
- On user request, the digitized content is moved to and from Avid and Apple FCP non-linear editing systems.
- Upon request, content from digital storage can be copied to videotape through the MassStore M-Ingest Print to Tape feature.

MassStore Workflow Details

While the MassStore modules and functions are tightly integrated together, for purpose of description, it is helpful to look at details of each individually.

M-Ingest for Ingest and Digitization

The first step in a digital workflow is to get the content from the videotape into a digital file format.

GMS uses two MassStore M-Ingest stations for this purpose. M-Ingest includes a software plug-in for MassStore plus hardware for the VTR interface and local storage.

M-Ingest is a frame accurate video encoding appliance that provides direct and automated control of baseband video with eight AES/EBU audio tracks. The GMS operator has access to select any or all eight tracks which can be grouped into pairs (1-2, 3-4, 5-6 and 7-8) during content encoding and playback.

Each ingest station is equipped with two Sony MSW M2100P/11 VTRs, under control of M-Ingest. Both VTRs are used for ingest, and one is used for Print to Tape of the content from digital storage. The Sony VTR accepts Betacam SP and Digital Betacam videotapes. The signals from the VTRs connect to M-Ingest via SDI inputs and outputs. M-Ingest controls the Sony VTRs through industry standard Sony RS422 VTR device control protocols.

When ingesting older tapes from the two archival videotape collections, GMS first runs them through an RTI tape evaluator and cleaner before ingest to remove dropout noise and other

unwanted tape problems. The better that artifacts can be removed before digitizing video, the more efficient the digitization process can be, since it won't have to try to assign bits to unwanted noise. Quality control (QC) is performed after ingest.

For new productions, the videotape is given a thorough technical QC before ingest.

As part of the ingest process, an operator enters metadata by filling out a form on the M-Ingest metadata interface on the GUI, which is also used for metadata retrieval and updating. The metadata fields shown to the user depends on how the user-custom fields are defined in MassStore. These fields can be changed and added to at any time, should GMS require it. Typical metadata are show or clip title, ID number, duration, and segment in and out points.

The metadata is provided to MassStore upon completion of capture and the time code of the source tape is retained in the digitized file. To retrieve and update the metadata associated with a piece of content, the M-Ingest application connects to the XML API of MassStore.

M-Ingest users can also search for imported assets in MassStore and retrieve the metadata of those assets using the M-Ingest Metadata interface. The metadata for each retrieved asset includes the SOM (start of message) and EOM (end of message) for each segment.

Once metadata is entered, the next step is to load the desired videotape into a Sony VTR. Through the Sony RS422 control on M-Ingest, the user can play, rewind, fast forward jog and shuttle through a tape, and mark in and out points using the embedded time code on the tape. The user can tell M-Ingest to ingest only specific segments (as indicated by marked in and out points), or the contents on the entire tape, and M-Ingest controls the VTR accordingly.

M-Ingest then captures and encodes the audio, video, timecode, and closed captions from the videotape into an MPEG2 at 50Mbps I-frame only (422P@ML) digital file, also known as IMX50, which is the GMS house master file format.

Once captured, the digitized file resides on a directory of the ingest server that is served out by FTP. GMS has configured MassStore Workflow Manager to direct M-Ingest to copy the IMX50 file first to the MassStore Cache nearline storage, and then into the digital tape library. The metadata is sent to MassStore and the video is copied from the FTP location.

Connectivity of M-Ingest to MassStore is via Gigabit Ethernet for content movement. Each M-Ingest workstation runs an FTP server for transfer of MPEG2/ IMX50 files to MassStore. In order to accomplish these transfers each M-Ingest workstation is configured as an input storage location in MassStore. Any number of M-Ingest servers with any amount of local storage can be supported. As noted, GMS has installed two M-Ingest stations.

M-Ingest is an important element of the overall MassStore Workflow Asset Management system at GMS. Because the Stornoway facility is not a transmission center, it doesn't have (or

need) station automation or playout video servers. In facilities where these two elements are present, ingest is often handled by an automation system with the video server creating the MPEG2 file, with MassStore then polling the video server for new content.

At GMS, a single vendor, Masstech, handles the entire process from ingest to storage to editing, back to storage and printing back to videotape. Truly an end-to-end solution.

MassTrans-It for File Format Transcoding and Proxy Creation

After the IMX50 file is created in ingest, the MassTrans-It module is directed by Workflow Manager to automatically create a frame-accurate low resolution (low bit rate) instance. This proxy is transcoded, with burned-in timecode, to the Windows Media 9 format at a resolution of 500 kbps and stored it in the IBM DS4200 disk storage array with 2 TB usable storage.

The MassTrans-It engine is available as a network resource within the MassStore environment, and can provide multiple transcode streams. MassStore communicates with MassTrans-It over Gigabit Ethernet. The MassTrans-It resources are accessed automatically through rules-driven protocols of MassStore as configured in Workflow Manager.

The proxies created by MassTrans-It are accessible within the network environment, and can be searched and browsed with MassBrowse.

MassTrans-It is also outfitted with transcode blades (different transcoding software applications) that are used with M-Connect to transform files to and from Apple FCP, and SavI to transform files to and from the Avid DET and DHM environment. (These are discussed further below.)

The MassStore extensible infrastructure allows GMS to add other MassTrans-IT transcoding scenarios to their system, should they desire to do so in the future.

MassBrowse for Proxy Viewing and Content Checking

MassBrowse provides a virtual cut editing and program preparation tool which can be used to manipulate and preview low resolution assets via any TCP/IP connection without the high cost of traditional editing equipment. The MassBrowse user-friendly interface includes an advanced hardware jog/shuttle panel as well as full metadata support, so that a user, working on a computer, can easily see what content is stored in MassStore, without having to copy the high resolution file to a video monitoring system.

At GMS, producers use MassBrowse primarily to review proxies of newly ingested material to check for content editorially and to see if subtitles are correct.

MassBrowse also can be used to segment content while viewing proxies, and to create edit decision lists which can be imported into a non-linear editing system. MassStore can use the segment data (in and out timecode points) to copy the high resolution version of the files, or parts of files, that were chosen in MassBrowse.

MassStore Manages Digital Tape Library

Once content has been ingested and converted into IMX50 file format, Workflow Manager directs MassStore to move the file to the SpectraLogic T120 digital tape library for long term storage.

The SpectraLogic T120 library is automatically managed by the MassStore application and all content migration to and from the library is automatically controlled by MassStore and can be governed by Workflow Manager rules. The digital library is GMS's main storage space for the essence (video/audio information) of file-based media content, plus metadata associated with those files.

Some refer to a digital library as an archive, but this is a limiting term that implies that material is stored there and then forgotten. The GMS digital library on the other hand is a dynamic part of its operations. While storage is an important component of a digital library, it's only one aspect of the entire workflow.

With a digital library as storage, ingested material becomes readily available for a multitude of uses. At GMS, stored content is used for automatic transfer between the library and the two non-linear editing systems, Apple FCP and Avid editing environment, and also between the two editing systems themselves.

MassStore Manages Nearline Cache

Transfers in and out of the digital tape library are buffered in the cache. MassStore uses an IBM DS4200 external RAID storage to provide cache storage and automatically manages the cache storage so that no user intervention is required. The RAID is connected to MassStore via Fiber Channel and operates in RAID level 3 configuration. RAID Level 3 stripes data at a byte level across several drives, with parity stored on one drive. The array is formatted to form a single contiguous volume.

MassStore Tracks Content in all Locations

MassStore maintains a database record of the entire inventory of digital files, and digital data tapes and the files stored on them, including those that are off-line, for every storage device that it's connected to. This information is used to keep the MassStore Content Management Database updated with which assets are in which physical location.

This information provides an accurate picture of the location of all assets in the entire environment. For example, an authorized user can use the MassStore user interface to locate a particular asset and then query the system to find out where it is currently stored. MassStore will then report which library contains the item. By automatically keeping this information up to date, MassStore can be used as the central knowledge point for locating assets.

When a request is made to have an item moved or copied from the tape library, MassStore initiates a source/destination transfer and the Content Management database is updated to show that this item now exists on the destination storage device.

When a digital asset is required to be archived to the digital data tape library, MassStore initiates a source/destination transfer and the Content Management database is updated to show that this item now exists on the tape library.

File groupings can be established on the tapes based on length of content or other Metadata like house ID, type of program like promo, program, etc. MassStore can automatically create one or multiple instances on tape for every single piece of media that is sent to archive.

MassStore Interfaces to BTS Traffic and Scheduling System

In the GMS system, MassStore, in addition to all its other functions, acts as a repository for the Broadcast Traffic Systems (BTS) traffic and scheduling system. The BTS system is still in development, but when completed, it will keep track of licensing agreements, hold closed captioning files, prioritize ingests, among other tasks.

For the interface with MassStore, BTS will write an XML interface to the MassStore API. BTS will poll MassStore periodically to become updated on content that has arrived in MassStore via the M-Ingest stations. BTS will make a request to MassStore for metadata that was collected during ingest, and it will pass relevant metadata to MassStore.

BTS will create a dub list daily or weekly, that will have a unique Asset ID number for each item. These Asset IDs will correlate to tapes that are to be ingested. An operator working on

an M-Ingest station, will then ingest the assets, naming each of them with their individual unique Asset ID.

MassStore Interfaces to Apple and Avid Non-linear Editing Systems

GMS has one Apple FCP edit suite, with plans to add at least one more. It also will have access to an Avid editing system in an adjacent technical facility.

GMS uses its FCP suite to QC video ingested from the archive videotape collections, segment these shows, re-cut breaks or cut to time, make aspect ratio conversions if needed plus create promotions and other material. With one edit suite currently in operation, projects can be shuffled around depending on priority, with unfinished projects saved for later retrieval. For example, a QC operation may have to give way to a hot promo.

To avoid edit room conflicts, to maintain editing efficiency and to obviate the need to constantly re-ingest material in the edit system, GMS required an easy means for storing editing projects as projects, with all the associated metadata. Since GMS was investing in the large central digital storage library, they wanted the projects saved there, instead of quickly filling up too much space in the higher cost local storage. This means that the edit system could be outfitted with less local storage.

And when an edited project is completed, GMS required that the resulting flattened file also be stored in the central digital storage library, and in the process transformed to the master house file format, IMX50. GMS expects that the flattened FCP files will not be used much in that form. Rather they will serve as stepping stones for the creation of the final IMX50 file.

When performing quality control checks on ingested material, GMS required a means for adding and changing metadata.

Once again, MassStore meets GMS requirements. MassStore, in addition to communicating with M-Ingest stations, nearline cache, and the digital tape library, also interfaces to the two non-linear editing systems—Apple Final Cut Pro Studio and Avid editing environment with a Media Composer Adrenalin with a single TransferManager.

Based on operator's decision and direction, the content within the MassStore environment can be moved to and from either of the two NLE systems or between them, with appropriate file transcoding or transformations. Both FCP and Avid work in the MPEG2 50Mbps I-frame format, but each has its own file wrappers.

Editors, producers, or operators search for and choose content they wish to move to the editing system in the MassStore environment via the MassStore user interface or via MassBrowse proxy browse application.

Content may also be transferred from FCP to Avid or vice versa using the interface with the MassStore system. In that case, content must be initially moved to the Cache and an operator will then need to initiate a transfer to either FCP or Avid.

Depending on workflow privileges, craft editors can add or change metadata using the MassStore or MassBrowse user interfaces.

MassStore provides separate interfaces to each of the NLE systems: M-Connect to the Apple Final Cut Pro Studio NLE, and SavI to the Avid editing environment.

MassStore M-Connect Interface to Apple Final Cut Pro Studio NLE

The Masstech M-Connect interface seamlessly interfaces MassStore to the Apple Mac G5 Final Cut Pro (FCP) Studio NLE platform. A GigE Ethernet switch is used to make the connections between the FCP workstations and the network.

M-Connect provides menu options on the MassStore GUI, so that the editor can send and retrieve content from MassStore via FTP services supplied by GMS.

M-Connect is used in two ways—to store and retrieve FCP projects and to store and retrieve final edited programs (also called flattened files).

Tapeless transfers of content into FCP is effected by the “Import from MassStore Platform” command. This transfers content into the FCP Studio production environment. Transfer of content out of FCP Studio is done by using the “Export to MassStore Platform” command. This sends projects and their related media files directly to MassStore. This way, if projects need to be interrupted, they can quickly and easily be saved, and then restored at a later time.

To send flattened projects (finished edited pieces) to MassStore, the command “Export Quicktime Movie” is used. When this command is enacted, MassTrans-It converts the FCP material to the MPEG2-IMX50 master file format and stores it in MassStore.

Masstech SAVI Avid Interface

Masstech SAVI allows MassStore to interface to and from the Avid editing environment, using Avid DET (Dynamically Extensible Transfer) or DHM (Data Handling Module) interfaces.

The key difference between DHM and DET is that the DHM implementation is based on a multiplexed stream of frames and creates media clips, while the DET implementation is based on transfers of existing media files. A GigE Ethernet switch is used to make the connections between the Avid system and the network.

While the SAVI Avid interface is installed in the Masstech system at GMS, work still needs to be done at the Avid end for the interface to be fully functional. An Avid TransferManager server needs to be installed for MassStore to integrate with Avid. This cannot be a shared box. No other applications can be controlling the TransferManager other than Avid and MassStore. Avid MediaManager is also required to identify the inventory.

The following describes how the MassStore-Avid interface will eventually work.

Masstech SAVI – DET (Dynamically Extensible Transfer) Interface

DET functionality allows for the full transfer of OMF or AAF-wrapped media files into (“DET Pull”) and out (“DET Push”) of the Avid system via the TransferManager to or from the MassStore system.

With the “Send to Workgroup” command, native files are transferred from Avid to the MassStore system storage. This involves the transfers of Avid media files, including master clips, and individual or consolidated sequences directly from within the Avid editing environment. All material remains in its native format and is unchanged during transfers. MassStore protects content and provides critical database and tracking capability, allowing for media to be searchable and recovered at any time. This means that material is quickly transferred back into the Avid environment on demand.

Using this capability, editors can archive their projects into MassStore including metadata, sequences, and referenced media files in their native OMF or AAF. This preserves the future ability to be able to edit the program material without having to re-ingest or transcode.

At any time during an edit session, required clips can be selected and loaded directly on to the Avid system within minutes.

Masstech SAvI – DHM (Data Handling Module) Interface

DHM functionality allows for MassStore to communicate with the Avid TransferManager to perform ingest transfers, and "send to playback". In this transfer method a sequence is either converted to or from a stream of video frames and audio samples.

For ingest, the editor is able to send content to Avid using the MassStore GUI. The editor can select an item on the MassStore GUI and send it to the Avid editor storage location. Then the "Ingest" command in the Avid editor interface begins the transfer process between MassStore cache via MassTrans-It engine and Avid TransferManager. The progress can be observed in the MassStore GUI.

The Avid TransferManager accepts a multiplexed stream of video and audio frames from the MassStore SAvI/DHM interface as MassTrans-It automatically converts the video and audio stream into an Avid-compatible clip. Specifically DHM performs the ingest by receiving individual frames and wrapping them into OMF/AAF format and checking the associated metadata into MediaManager.

Once an editing project is complete, MassStore further streamlines workflow by integrating directly with the Avid playout function (DHM).

On the "Send to Playback" command in the Avid editor interface, Avid TransferManager sends a multiplexed stream of video and audio frames to the MassStore SAvI/DHM interface.

To use this function, the editor can open a bin that contains the sequence to transfer, select the sequence and from the transfer menu, choose 'Send to Playback' submenu. From the submenu, the user selects the MassStore playback device. A dialogue window appears where the user has to input the TapeID (MassStore Asset name).

MassStore then initiates the transfer of the video from the Avid system to the cache via the MassTrans-It engine. MassStore accepts the stream of frames and creates a single clip, which is transcoded by MassTrans-It to the GMS house master format of MPEG2-IMX50, and stores it within MassStore. The transfer progress can be observed in the MassStore GUI.

Content is transferred between FCP and Avid by using the Avid DHM (Data Handling Module). MassTrans-It produces frame-accurate, high bitrate transcodes of video and audio MPEG2-IMX50 (50Mbps I-frame) streams into and out of an Avid editor into a compatible format. The sequence of frames coming from Avid is transcoded to the MPEG2-IMX50 format to be ready to be sent to FCP.

M-Ingest “Print to Tape”

In addition to ingesting content, M-Ingest can be used to decode MPEG2-IMX50 files to SDI video and AES audio and to copy the baseband signals to videotape. This is called “Print to Tape.”

To create a videotape copy of content stored in MassStore, an operator, using the M-Ingest user interface, selects an item and instructs M-Ingest to download that item into local storage. At that point the operator can preview the video/audio content on the computer screen or preferably on a broadcast quality video and audio monitor connected to the SDI and AES outputs of M-Ingest.

Once the correct content is ascertained, then the operator engages the “Print to Tape” command and M-Ingest controls the VTR to record a copy of the selected item as it outputs it to the VTR.

GMS commonly uses this function to transfer edited pieces to videotape to be shipped to the BBC Transmission Centre in Glasgow, where the new digital channel originates from, or to make them available for other uses.

Once a week, GMS runs a “content” search within the MassStore environment to list all new generated content and to export the selected assets out of the digital tape library for storage or use off site. The content file remains in the local digital storage library.

This operation is performed manually by GMS system operators using the MassStore GUI. Selected completed content is moved to M-Ingest and then output to the second SONY MSW M2100P/11 VTRs.

In the future, GMS would like to send files to Glasgow electronically, should that infrastructure be put in place.

Summary

With MassStore Workflow Asset Management system in place, GMS has begun the process of incorporating a digital workflow in its operations.

The Central Digital Storage library is becoming the main storage area for the facility, as videotape content gets converted to digital files. This makes it much easier to search for and retrieve needed material.

Having interfaces to the non-linear editing systems increases efficiencies further, in that material does not need to be ingested (or ingested again) in the edit suites themselves. Material in

the more economical central storage just needs to be selected and copied to the editing system. Projects can be saved as projects with all clips, timelines, and metadata stored intact, and quickly restored to the editing environment, allowing more efficient use of two edit suites, and saving on more costly local storage.

The editing system interfaces also means that Apple Final Cut Pro and Avid non-linear editors can easily share files between these two different systems.

Producers conveniently browse the automatically created low resolution proxy versions of ingested content for review and to select cuts for editing, all from the comfort of their office computer workstations.

MassStore makes it easy to convert digital files to videotape, the format that GMS currently uses to share content with outside entities.

MassStore provides the flexibility for system upgrading as GMS continues to moves forward with its digital workflow.

Customer Comments

From Uisdean MacLeod, Technical Operations Manager, Gaelic Media Service

“MassStore is simple and straightforward to use.”

“The MassStore user interface is good.”

“Masstech technical support is excellent.”

Overview

GMS Design Goals

GMS required a workflow asset management system to:

- Aid GMS in migrating from videotape to a digital file format and digital workflow.
- Overlay the existing GMS tape-based environment.
- Provide ingest and digitization of new and old material.
- Provide digital file storage and management.
- Provide a means for entering, modifying, and maintaining metadata about the content.
- Create a low resolution proxy of ingested material.
- Provide a means for searching, viewing, and manipulating proxy material, and linking results to the high resolution masters.
- Interface to two different non-linear editing systems.
- Provide file transcoding and transformations to/from different formats.
- Provide an interface to traffic and scheduling system.
- Provide a means of copying and converting digital files to videotape.
- Provide overall management of a digital file-based workflow environment.

Masstech Solution

The Masstech system consists of the following:

- Practical Asset Management application containing:
 - Embedded Database management (MassStore Database)
 - Web based client software for database interaction
 - Masstech MassStore Application Server and Software
 - Masstech Database Server and Relational Database Software
 - Two M-Ingest Stations, hardware and software, connected by Gigabit Ethernet
 - M-Connect Interface Software for interfacing to Apple Final Cut Pro NLW Studio Suite
 - DET/DHM SAVI Interface Software for interfacing to Avid Unity Media Composer Adrenaline with one Transfer Manager

- MassTrans-It engine for content transformation.
- Masstech DataMover Server
- MassBrowse proxy browse software (five licenses)
- SpectraLogic T120 digital tape library using three LTO3 series drives connected with Fibre Channel; plus associated interface and management
- IBM DS4200 2TB disk array for nearline storage—an intermediary cache between the Masstech Datamover and the SpectraLogic T120 Library, connected with Fibre Channel; and associated Interface
- Interface to AVID Media Composer Adrenalin with a single TransferManager - DET/DHM SAvI interface
- Interface to FCP NLE Studio Suite (one single group) - M-Connect Interface
- Interface to BTS Traffic System using XML-API interface

The Masstech essential Digital Content and Metadata Media Asset Management system performs the following key functions:

- Generates low resolution proxies of archived content.
- Provides an active picture of the location of all instances of assets in near real time.
- Continuously tracks all digital media assets by MassStore and made available for playout automatically as needed.
- Stores and uniquely identifies different formats (instances) of the same asset.
- Allows dynamic definition of the metadata associated with each asset.
- Contains a data structure that can be expanded at any point with no negative impact on the system.
- Allows the use of facility specific terminology such that GMS can use its own metadata fields at any point in the asset capture process, even after any amount of items have already been stored and tracked in the system.

Benefits

- GMS now needs to ingest videotape material only once to make it available for a wide variety of purposes including non-linear editing obviating the need to ingest solely for the editing sessions.
- The central digital library holds the file-based media content, where it can be easily searched and retrieved. Having the central library for all content storage means that local higher cost storage for the editing systems can be modest.
- MassStore provides an accurate picture of the location of all assets in the entire MassStore environment and is used as the central knowledge point for locating assets.
- Stored content is easily transferred and transformed between the digital library and the two non-linear editing systems, Apple FCP and Avid editing environment, and also between the two editing systems themselves.
- Editing sessions can be stored as projects—allowing the edit session to conveniently resume where it left off with all clips, timeline, and metadata intact, or as completed flattened files.
- Browsing low resolution proxy material allows producers to conveniently check for content and subtitles in the comfort of their offices at their computer workstations. It also allows producers to choose files or parts of files to be transferred to the editing environment.
- MassStore acts as a repository of for the Broadcast Traffic Systems (BTS) traffic and scheduling system.
- “Print to Tape” function of M-Ingest allows the conversion of file-based material to videotape for distribution.