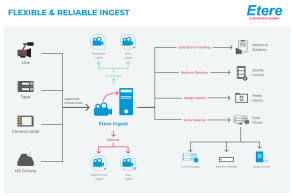
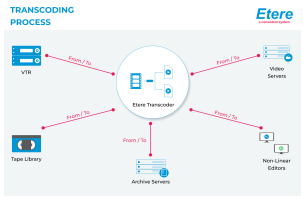
A Comprehensive Media Management Solution

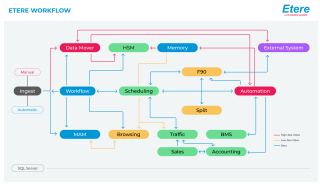
Please refer to the attachment for the full details on the Etere Media Management Solution.



Etere Ingest diagram



Etere transcoder decode, encode, transcode, mux, demux and filter almost any media



Etere Workflow diagram 1

Introduction
This document has been produced to provide information on how an all-embracing Etere system is able to fit specific requirements, and how the main components of its workflow are managed; owing to the complexity of a comprehensive broadcasting solution, all modules and features included in this paper have been organized by functionality in order to clearly illustrate most important goals, and bring an accurate presentation of all proposed solutions.

Etere offers its advanced technology to solve the needs of small and medium sized, existing and new broadcasters all around the world, allowing them to either implement a new or improve an existing tapeless workflow, turning their department islands into a distributed system based on cutting-edge and cost-effective solutions. Etere's approach provides broadcasters with faster than real-time workflows which allows the automation of old manual tasks, the ingestion and later presentation of contents in transcoded formats for a more suitable management, a multiformat archiving and metadata support.

Furthermore, Etere's environment includes heterogeneous file systems to allow true file sharing and a high level of finding archived contents. Etere will be able to perfectly manage, with improved efficiency and highly integrated design, all equipments provided by its strategic partner, SeaChange, that will provide the facility with a flexible and workflow-configurable product, a MCL/BMLex (Broadcast Media Library) video server, to perform flattening of edited sequences in preparation for playout; within this context, the ingestion of contents will be carried out via UML to the MCL device, to subsequently allow their edition, management and archiving into a LTO library, as well as their playout through the BMLex device.

Requirements
The request of the client has been summarized in five key points, which details how the facility must be implemented in order to achieve the capability to digitally migrate all their video contents in order to achieve a fully tapeless asset management, with a subsequent improvement of the quality of the entire broadcasting system.

In consideration of what stated before, Etereís strategic partner, SeaChange, will provide the client with various storage devices to ensure the migration of its material into the new system that must communicate all the departments within the station. Other capabilities requested by the client are described below:

Format
- The facility must support both SD and HD, in PAL, NTSC, 1080i and 720p
- 1080p, 3D and Digital Cinema-2k standards are not immediately required but system needs to be able to include in the future.

Capacity
- It is expected the Media Center would launch with 5 channels - 3xHD + 2x SD, within 18 months this would increase to 10 channels ó half HD and half SD, and within five years this would increase to 45 channels ó half HD and half SD
- Each channel would require 500 hours Ingest per year, ingest is primarily from tape and the 90% of tape ingest will be located at a remote site with the remaining 10% located at the Media Center
- Each channel would require 500 hours Data Archive in year one, rising to 2500 hours in total
- Commercials and interstitial content would be delivered as files over Remote

Ingest that will also allow the ability to send lower resolution files for delivery over IP
■ Each channel would require multiple audio and subtitle languages
■ Half of the channels would require end-credit voice-overs
■ Half of the channels would require live 2D DVE squeeze back or automated now/next/later graphics
■ Each HD channel may require 5.1 surround sounds, the Centre and workflow infrastructure should be designed around a 5.1 technical structure, and thus ensuring audio and video delays are minimal and compensated for
■ Currently, channels within this market are up-converting from stereo. An ability to create this up-conversion must be included

Workflow
■ A 'workflow' or 'media management' solution is required at start, its implementation will be in 3 phases
■ The proposed solution should allow movement of content to/from remote sites through
a gateway

Included Phases
■ Scheduling System Integration,
■ Traffic/Library Management,
■ Ability to use soft or hard parted content,
■ Tape Ingest,
■ Tape ingest at remote site,
■ Remote Ingest,
■ Subtitle file ingest,
■ Audio language file ingest,
■ Playout Integration,
■ Track tagging (audio) to allow track stacking at Playout Spot QC,
■ Data Archive Control,
■ Transcode & secure Workflow to defined Browse formats

Proposed Solution
ETERE is an integrated broadcasting solution that implements a modular system which is composed by a set of modules specifically oriented to cover each complex phase of a broadcasting system, focusing each module to efficiently perform an assigned operation such as ingestion, scheduling, automation, media management, etc. All these operations are synchronously performed within the same database environment and managed by suitable userdefined workflows that ensure an efficient overall system controlling; these are some of the main features that permit Etere to offer a modern tapeless workflow approach.

Through the following points is illustrated how Etere covers the entire information request:
The all-in-one Etere System is able to perfectly interface to the various media storage devices and carry out several functions related to them, thus, due to the distributed architecture of Etere, which permits to manage each process by using interconnected and task-specific modules, allowing in this way to have a single and integrated broadcasting solution.

■ Etere provides a unique integrated, end-to-end workflow and production platform for managing file-based IP delivered content
■ A Full featured ìWorkflow Managerî provides complex policy driven automated workflows at any broadcasting phase
■ Etere is based on the inexpensive database platform Microsoft SQL

A highly effective Ingesting solution reinforced with a digital content management designed specifically to streamline the process of ingest, indexing, storage and retrieval of digital assets. A centralized solution for handling digital content and its associated metadata.

■ Parallel processing and dynamic assignment of transcoding engines for faster format transcoding,

- Rich metadata exchange tools,
- Manual, scheduled and automatic ingestion of assets is supported,
- Versatile viewing, preparation and virtual editing of proxy files

An Integrated programming system that looks after all aspects of schedule planning, from reservation of space to real-time schedule manipulation; from Metadata and EPG creation to on-demand report generation.

- Integrated workflow from Scheduling to Automation
- Shared resources for with other modules
- Web integration
- Frame accurate scheduling
- Last minute changes capabilities
- Wide range of import/export formats
- Easy management of secondary events

Detailed Solution

Etere MAM is set of integrated applications which conforms a comprehensive Media Asset Management system, able to fit and streamline any digital operations workflow, by allowing to perfectly integrate core components such as the acquisition of contents (capture and encoding of digital media), editing of contents (creation and preparation of digital media), and management of rights (track of media ís contractual rights). Etere MAM is based on an extensible SQL database, and it is complemented by the various Etere modules which permit the entire system to reach a high level of integration, reliability and functionality; amongst the most important operations included on Etere MAM, the following can be mentioned:

- "Media Ingest": The use of Etere Ingest, automated ingest followed by highly effective and fully integrated quality control and metadata association.
- "Moving of Contentî: It is fully integrated with ETERE HSM, the intelligent hierarchical storage management system that controls the movement of media content between devices.
- "Metadata Support": Advanced metadata can be associated with each media file, ensuring fully comprehensive media content definition. Metadata can be asset or frame specific and can be constantly updated even after the original file is created
- "Data Sharing": Etere Asset Management ensures that all data associated to an asset (media, EPG, EDL, secondary events etc) is managed in centralized Asset Forms fully integrated and available across systems and applications
- "Multi-Format Transcoding": Automatic generation of both high and low resolution versions in real time, so contents can be correctly delivered to multiple platforms.
- "Workflow Management": The entire system is managed under an integrated workflow approach, which clearly defines each complex step of the broadcasting process.
- "Proxy Generation": Custom creation of low-resolution copies of content suitable for distribution, viewing and editing on standard office desktops.
- "Search and Retrieval": A unique and highly effective content retrieval system supports a multitude of search definitions which ensures an accurate and fast content retrieval
- "Web Accessibility": Etere Web gives access to media content from both central and remote locations, allowing real-time content search, retrieval, browsing and manipulation.
- "Content Management System": Etere CMS, the intelligent content management system, ensures quality of contents by identifying black/freezed video, irregular audio levels and scene changes.

Etere uses a so-called Asset Form to centralize the management of assets, which are mainly composed by a video content, associated metadata and rights information, within an Asset Form it is possible to insert metadata, associate media files, define rights, launch workflows, etc. Summarizing, ETERE MAM is a comprehensive digital asset management solution that will help optimize media content usage and return on investment by ensuring that your media is both fully accessible and easily retrievable.

4.2 Analogue and Digital Ingest: Etere Ingest
Etere Ingest is a versatile and modular software which significantly improves the process of ingesting media contents, this module is composed by various applications carefully developed to be perfectly integrated such in a way that an all-embracing solution is provided, capable to record from the major media feeds (e.g.: VTR, XDCAM, Videos Servers, NLE systems, etc), and store recorded media in specific storage locations defined via workflow, thus giving a unique mark of quality, consistence and reliability to asset's contents.

Etere Ingest not only allows stations to "manually" record media, but also permits to perform "scheduled ingest" which allows to capture media contents automatically within a date range with the further possibility of specifying the exact days and hours on which this action will be performed, this module also allows setting a GPI device that will send a signal for start/end the ingestion. The incorporation of a ìlive ingestî function allows among other things to schedule the ingestion of an asset that has to be broadcasted whilst is being recorded, Live assets can be customized by defining secondary events such as "auto-recording" or "time-delays" on their inside.

A wide range of function-specific applications are provided in order to carry out specific ingest
operations and improve the overall system with the following features:

■ Suitable workflows to manage other digital operations such as migration and transcoding of files
■ Intelligent user-defined rules to ensure that automated tasks are correctly performed
■ Ability to associate metadata and indicate the quality of the recording
■ Automatic transcode of media into the required format, thus reducing the probability of errors
■ A proxy version of ingested media is automatically generated
■ Support of two recording profiles, main and backup, to be switched in case of failure

Etere Ingest, jointly to the rest of modules which constitutes the Etere package, empowers the entire content management process, and due to the distributed architecture of Etere, it permits to build a system able to meet specific requirements and to encompass future implementations.

4.3 Migration and Transcoding: Etere Media Manager
Etere Media Manager is able to carry out the entire preparation and follow-up of contents according
to the ultimate broadcast requirements; this feature is achieved by the implementation of a set
of modules fully integrated under a distributed architecture system automated via workflow,
such in a way that the overall system is significantly improved and its single processes speeded
up.

Etere's migration and transcoding approach can turn an old workflow into an effective workflow, which will be characterized by the leveraging of open standards and the latest information technology advances. This workflow will be mainly composed by two individual, powerful and reliable modules:

Etere Media Manager is the application used to perform the physical storage and retrieval of video files. A typical Media Manager operation would be to move a video clip from a video server to an archive; this file migration can be between different levels of storage or storage locations of the same type. Actions are defined and executed via workflow, and video files automatically deleted when they are no longer needed with consequent resources optimization.

Etere Media Manager goes beyond the simple copy concept, they can move video files based on user-defined parameters to perform transcoding of migrated video

files that have been defined (as usual) via workflow.

Etere Media Manager expands the video server capacity by allowing to group an unlimited number of disk volumes as one single metadevice in which video files will be stored, and a subsequent fault-tolerant backup.

Etere Media Manager can be complemented with Etere HSM, an intelligent tape libraries manager, to include archiving of video files, so they will be on the right place at the right time, and most important thing: automatically. Both modules integrated with all other Etere solutions providing all the Etere MAM features such as browsing and preview of archived contents, as well as associating metadata to any single video clip frame to easily retrieve any stored material.

4.4 Broadcasting Playout: Etere Automation
Etere Automation is a powerful, reliable and modular broadcasting system, able to enhance broadcastersí potential in terms of functions and workflow design. Its unique approach combines in a single product real-time device control and media asset management, offering a powerful mix of solutions and capabilities.

Etere Automation unique distributed architecture provides a system that can grow and change to fit all broadcaster needs. It runs on Windows OS and controls all the broadcast system devices. Etere Automation uses the database of Etere Media Asset Management to integrate all the activities in a single environment. This allows you to retrieve all the assets stored in the station with no size limit, as well as to schedule management and last minute changes. Etere Automation manages all the secondary events with a simple graphical tool. With Etere Browsing it ís also possible to preview the secondary events in low res before playout.

Etere has the best fault tolerance on the market, because itís the only system with distributed playout intelligence and with real-time main and clone systems running. Clients can rely on the best data protection and the most advanced Fault Tolerant technologies.

■ Backup: As this is not normally active, significant resources are saved (i.e.: video server
ports). Whenever the Main Broadcasting System crashes, the Backup takes over.
■ Backup One to Many: This is a single recovery system for several channels. It represents an affordable quality solution for at least three to five main channels.
■ Clone: This has two synchronized systems with automation controllers which run two independent copies of the same play-list, ready to switch in case of fault.
■ Disaster Recovery: This is the best assurance if the whole system crashes (i.e.: due to earthquakes, storms, etc.). In this case a Clone Server is synchronized to the Main Server in a different facility (i.e.: another city or country).

Multi-Channel Control makes schedule management that much easier. Several stations can be distinguished by their respective logos. All events can be previewed and their actual duration displayed. The schedule grid is represented horizontally. You can easily highlight different programs on different channels. Programs can be located at first glance thanks to an efficient employment of colour association.

Each status and warning message uses different colours. Highlighted events on the screen show anomalies that need to be dealt with before broadcasting. Once verified, they can be skipped. In the case of an excessive number of warning messages, the Etere Support team takes over, providing a cross-check service by means of the SNMP workstation.

4.5 Production System Interface: Etere Scheduling
Etere Program Scheduling boosts efficiency in managing long-term scheduling. The Program Scheduling main characteristics derive from the Etere Traffic experience (i.e. as Etere Traffic manages commercial advertising, Program Scheduling manages Serial TV copyrights).

Etere Program Scheduling underlines the Strategic Editing aspects. It is an

integrated solution to manage copyright contracts, serial metadata and clips at the same time. The schedule grid may be segmented in advance according to the planned future programs to broadcast, so that serials, promos and short events may be scheduled apart from the digital content (i.e. before handling actual clips to broadcast).

Etere Program Scheduling allows operators to use a schedule grid to plan their own dynamic strategy over a virtual canvas in a shared environment. This grid allows operators to reduce error occurrences. A program sequence is pre-selected and automatically located, being careful to maintain a stable TV format.

The scheduling composition starts from parts of the day, then continues with the program definition (e.g.: cartoons, movie, etc.) and ends with the schedule template. Schedule simulations are allowed at any time.
At this point, operators are supposed to ask the purchasing department for the exact kind of contents they would like to schedule.

Program Scheduling is integrated with the automation and it can manage various scheduling levels through the use of its flexible but powerful module:

The Executive Editor component, with a multifunctional and user-friendly interface allows to easily building up sophisticated schedules, even permitting you to edit them schedule just before running. Rights Management integration handles the financial information of serials (e.g.: rights cost, production cost, varying cost, etc.) and provides the full economic exploitation of serial rights (i.e.: the system control if the serial contents have got the rights to be aired. The serial contract terms usually claim that the serial has to be broadcasted a certain number of times on appropriate channels within a certain time slot). Etere Program Scheduling with Audience integration is a standard feature. A chart audience wizard, related to the recorded video, gives a better comprehension of the competitors' audience composition.

Etere Browsing integration provides low-resolution previews. Customized reports are allowed as well. Etere Query Manager makes it easy to customize search parameters, saving the respective shortcuts for the following searches.

Etere leaves nothing to chance by providing exact statistical analysis and complete control of
the schedule workflow. You can always have an exact overview of what is going on your
Network (i.e. you can keep track of daily and hourly scheduling costs).

4.6 Deep Tape Archive: Etere HSM
The Media Management solution provided by Etere, encompass migration and archiving contents between devices, going beyond of a simple copy concept by moving video files based on custom policies, transcoding video files when required and offering a full track of all operations.

Etere HSM, which stands by Hierarchical Space Manager, is the cost-effective solution to radically streamline the management of expensive tape libraries; allowing stations to optimize the migration of contents including high and low versions as well as associated metadata. Etere HSM improves the management of libraries by controlling their mechanical movements through the HSM Robotics Control and HSM Data Pump applications, which are able to run several data pumps on different machines to boost their throughput, while offering access to real-time logs, reports and statistics.

Etere HSM distinguish four different archiving levels into a broadcasting workflow, these levels required distinct access times which vary from 0 minutes (video server) to 15 minutes (standard video tapes). All these levels are managed ìvirtuallyî, that is, you can use logical devices (metadevices) based on physical devices to free design your storage layout, enriching in this way the entire system with the benefits derived from the use of metadevices:
■ Carry out loan-balanced movements on an intelligent multi-volume scenario,

■ Extend your storage space by joining physical devices into one metadevice, without altering the archiving workflow,
■ Categorize your storage devices by dividing them into metadevices with no partitioning required
Space limits and storage distribution are defined by the user and not by devices itself
■ Classify metadevices in media pools in order to automate their management
■ Background defragmentation and online/offline tape management
■ Scheduled archiving of devices, media contents and entire databases

Etere Media Manager is the application used to perform the physical storage and retrieval of video files, a typical Media Manager operation would be to move a video clip from a video server to an archive based on custom actions which are defined and executed via workflow.

The tandem formed by Etere Media Manager and Etere HSM is the only solution in the market with an embedded multi-level and multi-rule cache that offers an intelligent management which ensures the best performances with low investments. Owing to Etereís comprehensive character, these applications are perfectly integrated with other modules such as Automation, MAM and News, allowing all these modules to use shared resources and have unlimited communication.

Achievable Benefits
Etereís solution, owing to its tapeless workflow approach for carrying out the management of assets, which carry out various functions such as a comprehensive media control, a functional property management, a reliable logistics management and a safe maintenance planning system.

In the basis of the aforementioned elements, ETERE will improve the overall system of the client in several points amongst which the most remarkable ones are mentioned below:
■ Digital management of contents from recording until broadcasting
■ Increased archiving capacity and streamlined access velocity
■ Possibility to carry out either manual, scheduled or automatic ingests
■ Ability to transcode with frame-accuracy video contents to the required formats
■ Full Multilanguage metadata support
■ Automatic transferring of scheduled contents
■ Boosted control over scheduled assets
■ A reliable and fully redundant sent on-air of events
■ Tapeless reception capabilities to remotely deliver requested contents